WORK PLAN

Brownfield Cleanup Program
Remedial Investigation Work Plan
SMC Brownfield Site
New Hartford, New York
Site No. C633016

Special Metals Corporation

May 2011

O'BRIEN & GERE

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SMC Brownfield Site
New Hartford, New York
Site No. C633016

Prepared for:
Special Metals Corporation

Douglas M. Crawford

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1. INTRODUCTION AND PURPOSE

1.1 GENERAL

This document is the Remedial Investigation (RI) Work Plan for the Special Metals Corporation (SMC) Brownfield Site located at 4317 Middle Settlement Road in New Hartford, New York (Figure 1). The RI is being performed in accordance with the Brownfield Cleanup Program (BCP).

The scope presented herein was developed based on reviews of previous sampling activities and discussions with the New York State Department of Environmental Conservation (NYSDEC).

1.2 OBJECTIVES

The objectives of the RI are to:

- Collect additional data necessary to evaluate and characterize the nature and extent of constituents associated with identified areas of concern (AOCs) resulting from historic use of the SMC Brownfield Site
- Evaluate potential exposure pathways between fish and wildlife resources and constituents associated with identified AOCs resulting from historic use of the SMC Brownfield Site
- Evaluate potential exposure pathways between human receptors and constituents associated with identified AOCs resulting from historic use of the SMC Brownfield Site
- Identify remedial action objectives
- Gather sufficient data to support remedial decision-making.

1.3 DOCUMENT FORMAT

This document contains the following sections:

Section 1 – Introduction and Purpose

Section 2 – SMC Brownfield Site History and Description

Section 3 – Remedial Investigation Work Plan

Section 4 – Remedial Investigation Reporting and Schedule

Section 5 – Citizen Participation Activities

2. SMC BROWNFIELD SITE HISTORY AND DESCRIPTION

2.1 SMC BROWNFIELD SITE LOCATION AND DESCRIPTION

The SMC Brownfield Site (approximately 42 acres) is located at 4317 Middle Settlement Road, New Hartford, Oneida County, New York. The SMC Brownfield Site lies within a larger property owned by SMC/Oneida County Industrial Development Agency. The SMC Brownfield Site and the larger encompassing property are zoned industrial, and are located in a mixed-use area. The SMC Brownfield Site borders a residential dwelling along its southeastern property boundary. In addition, an apartment complex is located approximately 600 feet to the south and other residential dwellings are located approximately 600 feet to the east. The facility has been in operation at this location since 1958. Operations at the facility include melting, hot rolling, and cold finishing. Melting is performed in vacuum induction, vacuum arc, and electroslag furnaces.

2.2 SMC BROWNFIELD SITE ENVIRONMENTAL HISTORY

A Site-Wide Investigation was conducted during 2007 to evaluate potential AOCs based on the operational history of the facility (O'Brien & Gere, 2007). In addition to the Site-Wide Investigation, an investigation of former Furnaces #7 and #8, located inside the facility, was conducted during 2007 and 2008 (O'Brien & Gere, 2008).

Groundwater

Groundwater concentrations of VOCs and SVOCs were below corresponding NYS Class GA groundwater standards. As such, groundwater results do not indicate a contaminated groundwater plume. Although several metals were detected above NYS Class GA groundwater standards, concentrations of these metals were similar to metals concentrations detected in the monitoring well that is hydraulically upgradient of the facility. PCBs were detected in groundwater in only two of thirteen wells, one in the vicinity of the Demolition Debris Landfill, and the other in the vicinity of Outfall 3.

Soil

Surface and subsurface soil sample results indicated VOCs, SVOCs, and PCBs were detected at concentrations below the 6 NYCRR Part 375 soil cleanup objectives for industrial-use sites. One sample of black material was encountered in the Former Landfill, which exhibited PCB and SVOC concentrations. In areas where PCB groundwater concentrations exceeded the NYS Class GA groundwater standard (Demolition Debris Landfill and vicinity of Outfall 3), corresponding soil samples did not indicate detectable concentrations of PCBs.

Sediment/Soil

Sediment/soil samples collected at Outfalls 3, 4, and 5 exhibited SVOCs, PCBs, and metals at concentrations above guidance criteria provided in *Technical Guidance for Screening Contaminated Sediments* (NYSDEC, January, 1999). Sediment samples collected in Mud Creek exhibited no detectable concentrations of PCBs. With the exception of benzo(b)fluoranthene in one sample, sediment samples collected in Mud Creek exhibited SVOC and metal concentrations generally similar to upgradient concentrations detected in SED-02. Sediment samples collected from catch basins and manholes along the facility storm sewer exhibited concentrations of metals and PCBs at various locations.

Surface water

Surface water samples collected in Mud Creek exhibited no detectable concentrations of PCBs or SVOCs. Surface water samples collected in Mud Creek exhibited metals concentrations below Class C Surface Water Criteria.

SMC implemented investigations of two former furnace areas (Furnaces #7 and #8) within the SMC facility during 2007 and 2008. These investigations included the collection of soil and groundwater samples. The results of the former Furnaces #7 and #8 investigations indicated PCB and methyl ethyl ketone (2-butanone) concentrations above the NYS Class GA standards in groundwater with noted free product. Subsurface soil results showed PCBs at concentrations greater than the 6 NYCRR Part 375 soil cleanup objectives for industrial sites (six of sixteen samples) and VOCs at concentrations below the 6 NYCRR Part 375 soil cleanup objectives for industrial sites and protection of groundwater.

SMC historically utilized a surface impoundment near its Pilot Plant for the neutralization of spent mixed acids originating from the facility's etching processes. Since 1981, SMC has implemented a voluntary groundwater monitoring program to monitor (nickel, chromium, fluoride, nitrate, and sulfate) in groundwater near and down gradient of the former Surface Impoundment. Based on declining constituent concentrations between 1981 and 1986 near the surface impoundment, and steady levels in downgradient monitoring wells, DEC classified the surface impoundment as closed. The monitoring program, conducted under DEC's Voluntary Resource Conservation and Recovery Act (RCRA) program, included the collection of groundwater samples for nickel analysis on a semi-annual basis. The most recent semi-annual report from the fall of 2010 is provided in Attachment 1. In a letter dated January 3, 2011 from DEC, further action of the former Surface Impoundment under the RCRA Corrective Action Program was formally suspended. The letter stipulated that further evaluations of the former Surface Impoundment be conducted under the Brownfield Cleanup Program.

A summary of constituents detected above applicable regulatory criteria is provided on Figure 2. It should be noted that constituents detected above applicable regulatory criteria associated with former Furnaces #7 and #8 are not shown on this figure. Environmental impacts associated with former Furnaces #7 and #8 will be addressed through implementation of an appropriate interim remedial measure (IRM) under NYSDEC oversight.

2.3 PRELIMINARY SITE CONCEPTUAL MODEL

The following summarizes the preliminary site conceptual model for the SMC Brownfield Site:

- The SMC Brownfield Site is located in the Mohawk Valley Lowlands physiographic province, which is characterized by gentle sloping topography of the Mud Creek Valley.
- Bedrock beneath is reported to consist of gray shales and siltstones of the Ordovician-aged Frankfort Formation (Fisher, Isachsen, and Rickard, 1970).
- The overburden geology of the region is dominated by relatively low permeability, poorly sorted, variable textured till consisting of clay, silt-clay, and boulder clay that was deposited beneath glacial ice (Caldwell and Dineen, 1987).
- The SMC facility is in an area that has proglacial fluvial deposited outwash sand and gravel consisting of well rounded and stratified coarse to fine gravel with sand, ranging in thickness from approximately 6 to 60 feet on top of the glacial till (Caldwell and Dineen, 1987).
- Groundwater is present within the shallow silty sand and gravel unit and within the underlying till.
- The shallow silty sand and gravel water-bearing unit is considered to be more permeable compared to the underlying till, and has the highest potential for contaminant transport.
- Overburden groundwater generally flows southward, discharging to Mud Creek. The vulnerability for groundwater contamination from the SMC Brownfield Site to off-site areas is likely low.
- Based on historic analytical results, the contaminants of concern (COCs) associated with environmental media include SVOCs, PCBs, and metals.
- Potentially affected environmental media may include surface soil, subsurface soil, overburden groundwater, surface water, and sediment.

- Known areas of contamination include the former Surface Impoundment Area, the former Furnace #7 and #8 Area, and the former Landfill. In the vicinity former Surface Impoundment Area, elevated concentrations of nickel were detected in overburden groundwater. In the vicinity of the former Furnace #7 and #8 Area, elevated concentrations of PCBs were detected in subsurface soil and groundwater. Free-product containing PCBs was also encountered in subsurface soil and groundwater in this area. Black material that contained elevated PCB and SVOC concentrations was encountered in the subsurface at the former Landfill.
- Potential areas of contamination include the Demolition Debris Landfill, historic and active outfalls, the Rinse Water/Acid Spill Area, the Pilot Plant, and former Furnaces #2 through #5.

2.4 IDENTIFICATION OF AREAS OF CONCERN

Areas of Concern (AOCs) at the SMC Brownfield Site were identified based on a review of historical aerial photographs, and spill reports, as well as a review of historic facility operations. Subsequent analytical testing resulted in the identification of the following six AOCs, which were submitted as part of the BCP Application, as warranting further study:

- Demolition Debris Landfill
- Former Landfill
- Historic and Active Outfall AOCs
- Rinse Water/Acid Spill
- Former Furnace #7 and #8 Area
- Former Surface Impoundment Area

These AOCs will be further evaluated during the RI. In addition, during a December 15, 2009 walk-through at the facility with O'Brien & Gere and SMC representatives, NYSDEC identified several other potential AOCs that are incorporated into this RI Work Plan.

- North Drainage Swale
- Pilot Plant Exterior Building Foundation Staining
- Pilot Plant Drainage Swale
- Former Generator Room (inside facility)
- Former Furnaces #2 through #5 (inside facility). It should be noted that only former Furnaces #4 and #5 are included for evaluation during the RI. Based on discussions with plant personnel, former Furnaces #2 and #3 were relatively small furnaces located above the facility floor, with no associated trenches or sumps. Operation of former Furnaces #2 and #3 is not believed to have involved hydraulic oil. For these reasons, subsurface environmental effects are not anticipated to have occurred related to these former furnaces. In addition, the locations of former Furnaces #2 and #3 are currently inaccessible due to active facility operations. Therefore, SMC is not proposing environmental sampling in the vicinity of former Furnaces #2 and #3.

The following two areas are not proposed to be part of the RI, although also noted during the December 15, 2009 site walk-through:

Re-graded Area West and South of Pilot Plant. The area west and south of the pilot plant was re-graded during the summer of 2009 by SAES, the current occupants of the Pilot Plant Building. The re-grading efforts were conducted in response to a request by NYSDEC that a pathway for excess cooling tower non-contact water runoff be established between the Pilot Plant cooling tower and Mud Creek. The excess cooling tower non-contact water originates within the small building behind the Pilot Plant and is conveyed to the exterior via a small drain pipe that protrudes from the southern side of the building foundation. Following sampling of the water and submittal of toxicity information regarding water treatment chemicals, the discharge is currently regulated as a permitted SPDES outfall. No sampling in this area is proposed at this time.

Concrete Pads West of Pilot Plant. The concrete pads located west of the Pilot Plant were used for argon gas tanks associated with historical operations in the Pilot Plant. SMC is not proposing sampling in the vicinity of concrete pads located west of the Pilot Plant.

3. REMEDIAL INVESTIGATION WORK PLAN

3.1 FIELD ACTIVITIES PLAN

The Field Activities Plan (FAP) for the SMC Brownfield Site is provided in Appendix A of this RI Work Plan. The FAP presents the field activities to be conducted as part of the RI, as well as the procedures for implementing RI field investigations to evaluate the AOCs identified in Section 2, as well as Mud Creek, facility groundwater, and surface soil from certain areas outside the identified AOCs. The FAP also provides rationale and detailed procedures for collecting environmental samples including equipment and personnel requirements, drilling and well installation techniques, sampling techniques, and equipment decontamination procedures. Deviations from the FAP will require notification and prior approval of NYSDEC.

3.2 QUALITY ASSURANCE PROJECT PLAN

The Quality Assurance Project Plan (QAPP) for the SMC Brownfield Site is provided in Appendix B of this RI Work Plan. The QAPP provides quality assurance/quality control (QA/QC) criteria for work efforts associated with the sampling of environmental media as part of the RI.

This QAPP will assist in generating data of a known and acceptable level of precision and accuracy. The QAPP provides information regarding the project description and personnel responsibilities, and sets forth specific procedures to be used during sampling of relevant environmental matrices, other field activities, and the analyses of data. The procedures in this QAPP will be followed by personnel participating in the field investigation and in the laboratory analyses of environmental samples.

3.3 HEALTH AND SAFETY PLAN

The Health and Safety Plan (HASP) for the SMC Brownfield Site is provided in Appendix C of this RI Work Plan. The HASP has been developed to provide both general procedures and specific requirements to be followed by field personnel while performing RI activities at the SMC Brownfield Site.

The HASP describes the responsibilities, training requirements, protective equipment, and standard operating procedures to be used by personnel to address potential health and safety hazards while in investigation areas. The plan specifies procedures and equipment to be used by personnel during work activities and emergency response to minimize exposures of personnel to hazardous materials.

Given the scope of the work proposed as part of the RI field activities, potential contaminant exposure to the surrounding community and workers on the property is considered to be very low. The proposed sampling would not likely impact air quality of the local community. Particulate emissions related to site media are not anticipated during the sampling given the shallow depth to ground water. In addition, based on work previously completed at the site, VOC emissions in the breathing zone within the immediate work area are not anticipated. Notwithstanding this, a Community Air Monitoring Plan (CAMP) will be prepared and implemented during the proposed RI activities.

3.4 DATA MANAGEMENT AND VALIDATION

Analytical data from the laboratory will be received in hardcopy and electronic format. The electronic data will be entered into a project database for use in preparation of summary tables.

Analytical data will be validated as discussed in the QAPP. A Data Usability Summary Report will be prepared by a data validator and included as an appendix in the RI Report.

3.5 FISH AND WILDLIFE IMPACT ANALYSIS

A Fish and Wildlife Resource Impact Analysis – Resource Characterization (FWIA) will be performed at part of the RI. The FWIA will be performed in accordance with the NYSDEC *Fish and Wildlife Impact Analysis for Inactive*

Hazardous Waste Sites guidance document (NYSDEC 1994). FWIA Step IIB – Criteria-Specific Analysis will be completed for this effort.

In accordance with the FWIA guidance, a qualitative evaluation of actual or potential impacts to fish and wildlife resources from site-related constituents will be performed. The evaluation will include a description of the ecological resources located on and within 0.5-miles of the SMC Brownfield Site. Available information and the resource descriptions developed from the evaluation will be used to characterize the exposure setting, identify migration pathways, and evaluate contaminant fate and transport and potential effects to fish and wildlife resources. This information will also be used to identify contaminants of potential ecological concern (COPECs) via comparison of the existing site media data to ecologically-based screening values and/or criteria.

The results of the Step IIB FWIA will be used to identify the need to advance the FWIA to Step IIC – Toxic Effect Analysis. Completion of the Step IIC is not included in the scope of work defined herein.

Figure 3 presents wetland habitats as mapped by the NYSDEC and USFWS. The NYSDEC developed wetland maps pursuant to Article 24 of the New York State Environmental Conservation Law. The maps present the approximate boundaries of freshwater wetlands regulated by the NYSDEC. In most instances, the mapped boundaries are based on aerial photography and soil survey interpretation and, therefore, require specific field verification. The U.S. Fish and Wildlife Service (USFWS), through its NWI Project, has produced a series of maps to identify wetlands that provide significant waterfowl habitat in the U.S. Although these maps are helpful in the preliminary identification of wetlands, they do not represent federally regulated wetlands.

Verification of the state and federally mapped wetlands will be performed via wetland delineation in areas immediately adjacent to the SMC Brownfield Site potentially impacted by current or former activities. Delineation efforts will be focused on the portion of the Mud Creek corridor located south of the southwestern SMC Brownfield Site boundary. The wetland delineation will be performed in accordance with applicable federal and State methodologies (*i.e*., 1987 U.S. Army Corp of Engineers *Wetlands Delineation Manual* and 1995 NYSDEC *Freshwater Wetlands Delineation Manual*).

3.6 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

The qualitative human health exposure assessment will be conducted in accordance with Appendix 3B of *New York State Technical Guidance for Site Investigation and Remediation, DER-10* (NYSDEC, Draft November 2009), and will be documented in an Exposure Pathway Analysis Report (EPAR) and qualitative discussion of risk within the RI Report. The analysis will consist of evaluation of potential exposures of humans to constituents present on the SMC Brownfield Site based on current and future potential uses of the SMC Brownfield Site. The analysis will be prepared as table summaries which will be developed consistent with the *Risk Assessment Guidance for Superfund: Volume 1 – Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments* (USEPA 2001)), referred to as RAGS D. The exposure assessment will summarize potential exposure pathways and identify whether each pathway is complete or incomplete. This evaluation will provide a qualitative assessment of risk to humans from potential exposure to soil and groundwater media.

The RI Report will include comparisons of environmental sampling data to New York State screening values. Soil concentrations will be compared to 6 NYCRR Part 375 Industrial Use Soil Cleanup Objectives. Groundwater concentrations will be compared to screening values presented in the *New York State Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Technical and Operational Guidance Series* (TOGS 1.1.1, NYSDEC 1998). The frequencies of detection above the New York State screening values will be included in this evaluation.

4. REMEDIAL INVESTIGATION REPORTING AND SCHEDULE

Upon completion of the tasks detailed in the FAP, an RI Report will be completed. This report will summarize the data collected during the RI, as well as relevant data collected prior to the RI. Conclusions based on these data will be provided, as well as the following information:

- An updated SMC Brownfield Site description, if necessary
- Updated SMC Brownfield Site maps
- Field investigation results
- Hydrologic interpretation
- Chemical analyses results
- Nature and extent characterization
- FWIA results
- Human health exposure assessment results
- An updated Conceptual Site Model, if necessary
- Assessment of existing data to assess whether there is the need for supplemental data collection

SMC anticipates initiating the RI in the third quarter of 2011. Anticipated project milestones are as follows:

Milestone Activity	Anticipated Schedule
RI Work Plan Submittal to NYSDEC for Review	May 27, 2011
NYSDEC RI Work Plan Review Period / Public Comment Period	May 30 – June 28, 2011
Incorporate NYSDEC RI Work Plan Comments	June 29 – July 8, 2011
RI Work Plan Approval	July 15, 2011
Final RI Work Plan to Repository	July 15, 2011
RI Implementation Period	August 8 – October 28, 2011
RI Completion Report Submittal to NYSDEC	March 2, 2012

5. CITIZEN PARTICIPATION ACTIVITIES

Citizen participation activities are documented in the Citizen Participation Plan which has been provided to NYSDEC under separate cover.

REFERENCES

Caldwell, D.H. and Dineen, R.J., 1987. Surficial Geologic Map of New York – Hudson-Mohawk Sheet, New York State Geological Survey

Fisher, D.W., Isachsen, Y.W., and Rickard, L.V., 1970. *Geologic Map of New York – Hudson-Mohawk Sheet*, New York State Museum and Science Service, Map and Chart Series No. 15.

O'Brien & Gere, July 2007. *Data Summary Report Site-Wide Investigation and Former Furnaces #7 and #8 Investiagtion*, Special Metals Corporation.

O'Brien & Gere, October 2008. *Pre-Remedial Soil Boring Program Report – Furnace 7 & 8 Investigation Area, Special Metals Corporation, New Hartford, New York*.

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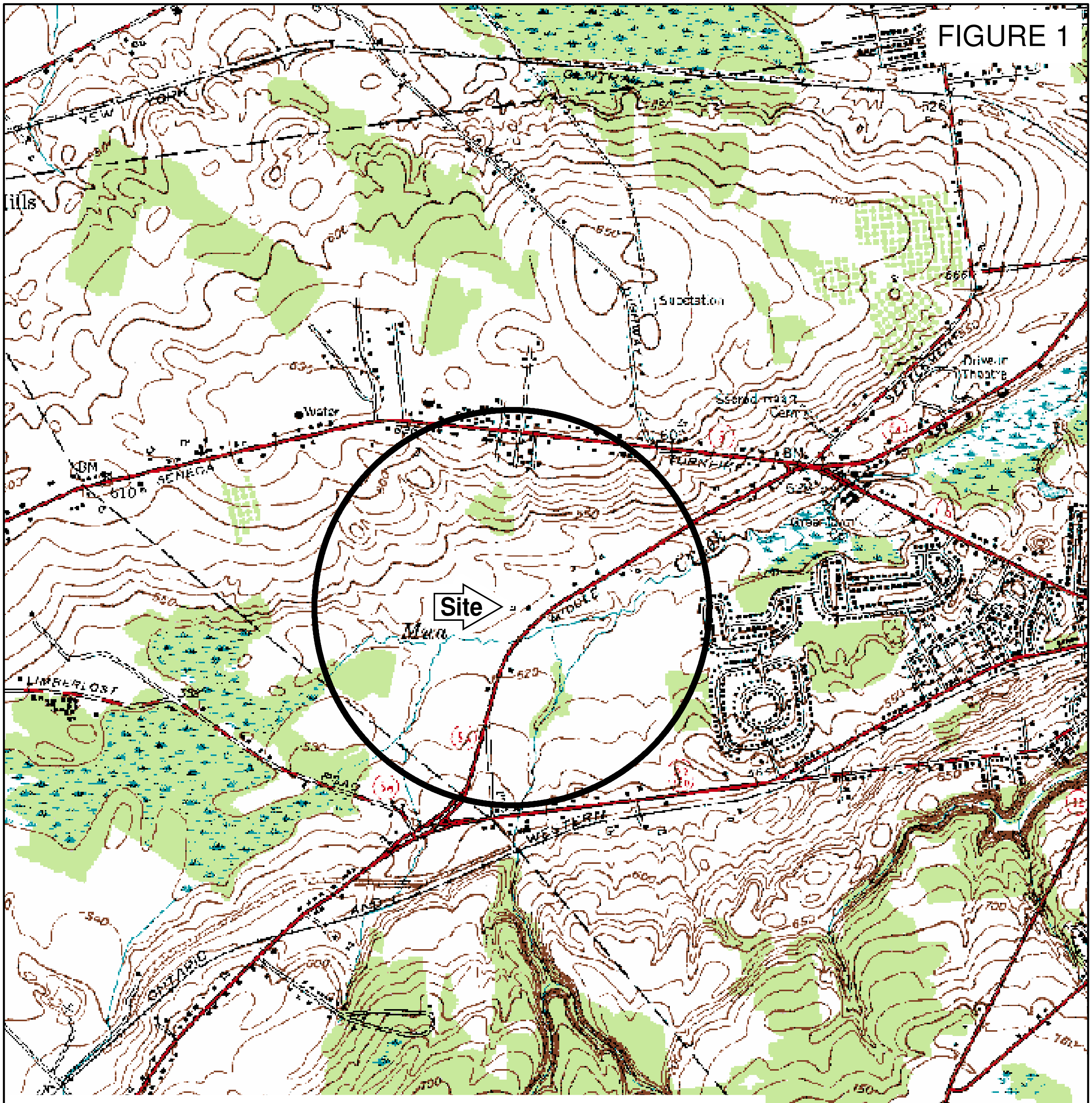
FIGURE 1



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PLOT DATE: 06/20/07 DIV 71 LSR

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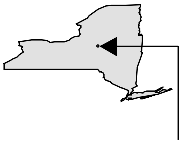

QUADRANGLE LOCATION

SPECIAL METALS CORP.
4317 MIDDLE SETTLEMENT RD.
NEW HARTFORD, NEW YORK

SITE LOCATION

0 1,000 2,000 4,000 6,000 8,000

Feet

FILE NO. 2290
DECEMBER 2009

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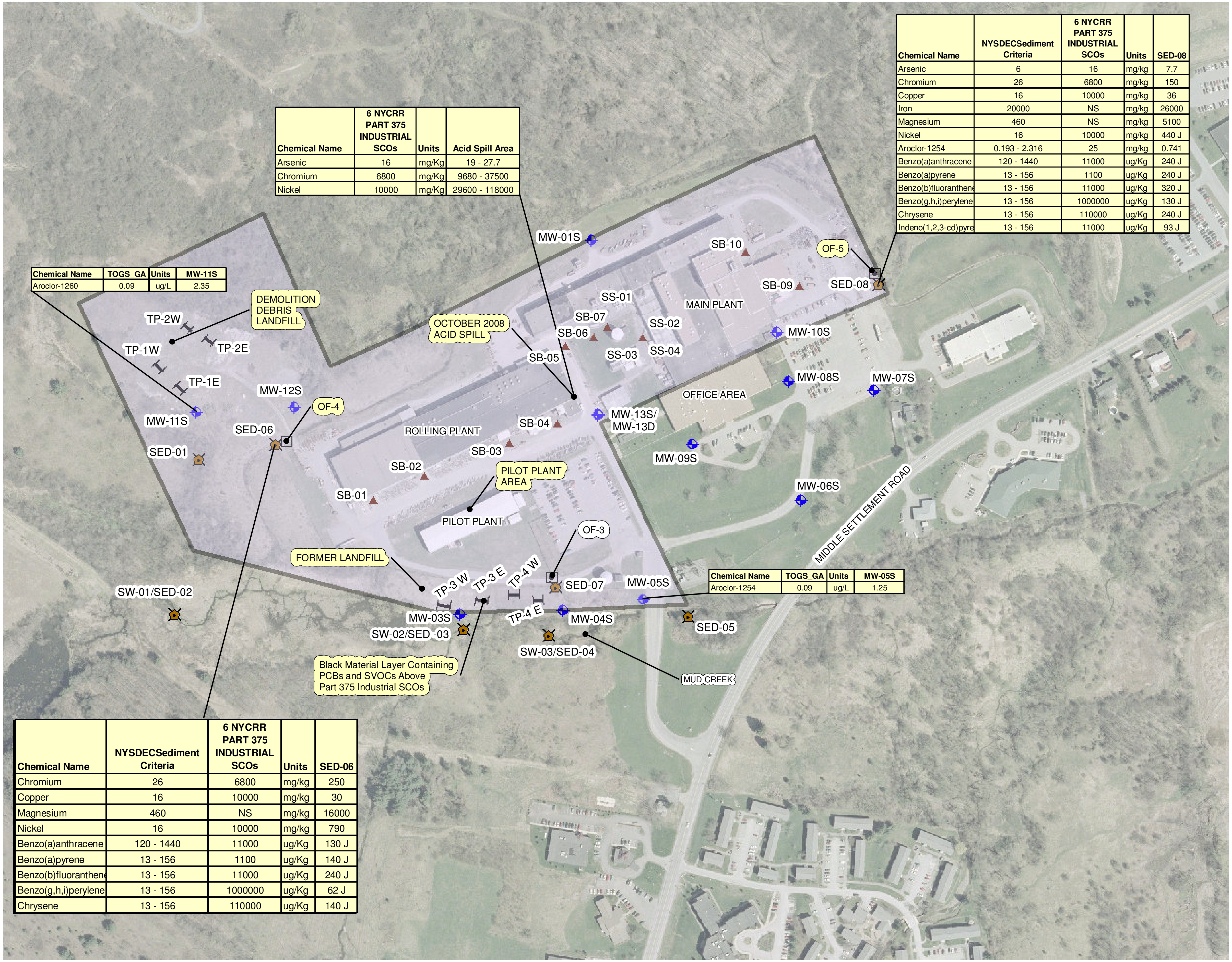
FIGURE 2



Chemical Name	6 NYCRR PART 375 INDUSTRIAL SCOs	Units	Acid Spill Area
Arsenic	16	mg/Kg	19 - 27.7
Chromium	6800	mg/Kg	9680 - 37500
Nickel	10000	mg/Kg	29600 - 118000

Chemical Name	TOGS_GA	Units	MW-11S
Aroclor-1260	0.09	ug/L	2.35

Chemical Name	NYSDECSediment Criteria	6 NYCRR PART 375 INDUSTRIAL SCOs	Units	SED-08
Arsenic	6	16	mg/kg	7.7
Chromium	26	6800	mg/kg	150
Copper	16	10000	mg/kg	36
Iron	20000	NS	mg/kg	26000
Magnesium	460	NS	mg/kg	5100
Nickel	16	10000	mg/kg	440 J
Aroclor-1254	0.193 - 2.316	25	mg/kg	0.741
Benzo(a)anthracene	120 - 1440	11000	ug/Kg	240 J
Benzo(a)pyrene	13 - 156	1100	ug/Kg	240 J
Benzo(b)fluoranthene	13 - 156	11000	ug/Kg	320 J
Benzo(g,h,i)perylene	13 - 156	1000000	ug/Kg	130 J
Chrysene	13 - 156	110000	ug/Kg	240 J
Indeno(1,2,3-cd)pyre	13 - 156	11000	ug/Kg	93 J

Chemical Name	TOGS_GA	Units	MW-05S
Aroclor-1254	0.09	ug/L	1.25

Chemical Name	NYSDECSediment Criteria	6 NYCRR PART 375 INDUSTRIAL SCOs	Units	SED-06
Chromium	26	6800	mg/kg	250
Copper	16	10000	mg/kg	30
Magnesium	460	NS	mg/kg	16000
Nickel	16	10000	mg/kg	790
Benzo(a)anthracene	120 - 1440	11000	ug/Kg	130 J
Benzo(a)pyrene	13 - 156	1100	ug/Kg	140 J
Benzo(b)fluoranthene	13 - 156	11000	ug/Kg	240 J
Benzo(g,h,i)perylene	13 - 156	1000000	ug/Kg	62 J
Chrysene	13 - 156	110000	ug/Kg	140 J

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Legend

▭	SMC BROWNFIELD SITE (42 ACRES)
⊡	HISTORIC OUTFALLS
—	TEST PIT
⌖	MONITORING WELL (SAND & GRAVEL UNIT)
⊗	SEDIMENT/SOIL SAMPLE (TBD)
⊗	SURFACE WATER SAMPLE
▲	SOIL BORING
●	SURFACE SOIL

SPECIAL METALS CORP.
4317 MIDDLE SETTLEMENT RD.
NEW HARTFORD, NEW YORK

HISTORIC ANALYTICAL DATA

0 150 300 600
Feet

MAY 2011

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NAME: CarnevDJ

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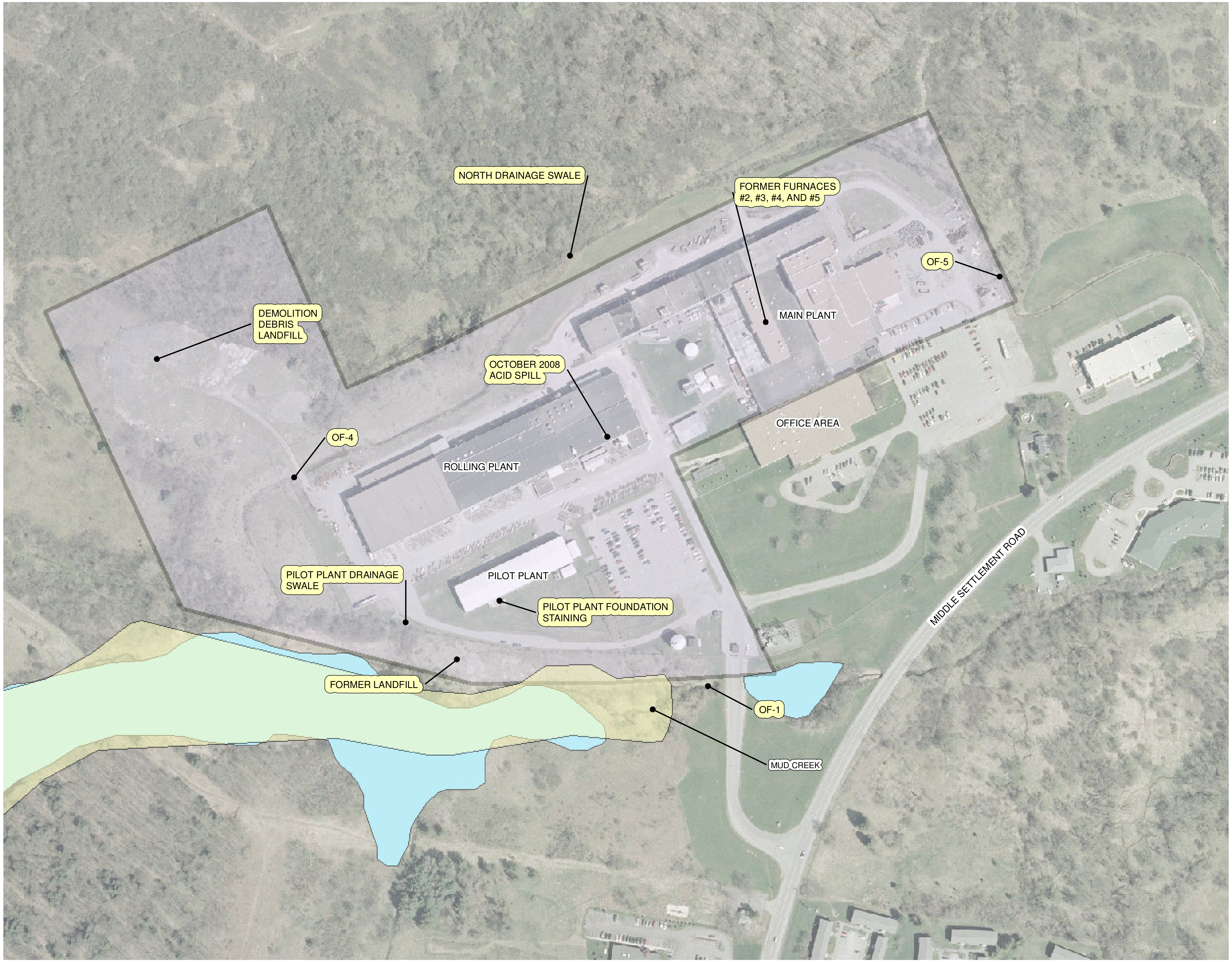
FIGURE 3



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Legend

▭	SMC BROWNFIELD SITE (42 ACRES)
🟨	NYS MAPPED WETLANDS
🟦	USFWS NATIONAL INVENTORY MAPPED WETLAND
FORMER LANDFILL	AREA OF CONCERN

SPECIAL METALS CORP.
4317 MIDDLE SETTLEMENT RD.
NEW HARTFORD, NEW YORK

WETLANDS

0 125 250 500
Feet

MARCH 2011

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DATE: 3/15/2011 10:38:23 AM

Appendix A – Field Activities Plan (FAP)

Appendix B – Quality Assurance Project Plan (QAPP)

Appendix C – Health and Safety Plan (HASP)

FIELD ACTIVITIES PLAN

Brownfield Cleanup Program
Remedial Investigation
SMC Brownfield Site
New Hartford, New York
Site No. C633016

Special Metals Corporation

May 2011

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1. INTRODUCTION

1.1 GENERAL PLAN

This Field Activities Plan (FAP) for the Special Metals Corporation (SMC) Brownfield Site (Figure 1) presents the field activities to be conducted, and the procedures for implementing Remedial Investigation (RI) field investigations. This FAP describes the areas of concern (AOCs) to be investigated and provides detailed procedures for collecting environmental samples including:

- equipment and personnel requirements
- drilling and well installation techniques
- sampling techniques
- equipment decontamination procedures.

Deviations from this FAP will require notification and prior approval from the New York State Department of Environmental Conservation (NYSDEC).

2. REMEDIAL INVESTIGATION FIELD ACTIVITIES

The RI field activities include surface soil sampling, soil borings and subsurface soil sampling, monitoring well installations and ground water sampling, surface water and sediment sampling, and surveying of sampling locations.

Samples collected during field implementation of the RI will be analyzed according to the following table:

TABLE 2-1: SAMPLE ANALYSIS SUMMARY

SAMPLE MEDIA	ANALYSES	ANALYTICAL METHOD
Surface Soil **Subsurface Soil** **Surface Water** **Groundwater**	TCL VOCs plus TICs	USEPA Method 8260B
	TCL SVOCs plus TICs	USEPA Method 8270C
	TCL PCBs	USEPA Method 8082
	TAL Metals	USEPA Method 6010B
	Cyanide	USEPA Method 9012A
	Mercury	USEPA Method 7470A
Sediment	TCL VOCs plus TICs	USEPA Method 8260B
	TCL SVOCs plus TICs	USEPA Method 8270C
	TCL PCBs	USEPA Method 8082
	TAL Metals	USEPA Method 6010B
	Cyanide	USEPA Method 9012A
	Mercury	USEPA Method 7470A
	TOC	Lloyd Kahn
Non-Native Subsurface Material	VOCs	TCLP
	SVOCs	TCLP
	PCBs	TCLP
	Metals	TCLP

Notes: TCL VOCs – Target Compound List Volatile Organic Compounds
TCL SVOCs - Target Compound List Semivolatile Organic Compounds
TCL PCBs – Target Compound List Polychlorinated Biphenyls
TAL Metals – Target Analyte List Metals
TICs – Tentatively Identified Compounds
TCLP – Toxicity Characteristic Leaching Procedure

Details pertaining to quality assurance/quality control (QA/QC) requirements are provided in the Quality Assurance Project Plan (QAPP) provided as Appendix C of the RI Work Plan.

2.1 DEMOLITION DEBRIS LANDFILL

The Demolition Debris Landfill AOC is located in the northwest portion of the SMC Brownfield Site, as shown on Figure 2. Debris (*e.g.* concrete, asphalt) from general site development activities such as excavation, building demolition, and new building construction have reportedly been placed in this area over the years.

2.1.1 Surface Soil Sampling

Three surface soil samples will be collected to provide data to evaluate potential exposure pathways. The proposed locations for the surface soil samples are shown on Figure 2. Samples will be collected from the 0 to 2-inch and 0 to 6-inch intervals in accordance with the procedures in Appendix A-4. Surface soil sample analytical parameters will be in accordance with Table 2-1.

2.1.2 Test pitting and Subsurface Soil Sampling

To evaluate the vertical extent of fill within the Demolition Debris Landfill AOC, three test pits will be excavated to native material underlying the landfill, as illustrated on Figure 2. The test pits will be excavated using a track-mounted excavator. Subsurface samples will be collected from the excavations at approximate 5-ft intervals from ground surface to the top of the native soils underlying the fill materials. The soil samples will be described as to its color, moisture content, and grain-size distribution. This descriptive information will be recorded on test pit logs. Soil samples will be screened for the presence of VOCs using a portable photoionization detector (PID). The PID screening will be conducted by placing a representative portion of the sample in a plastic zip-lock bag and allowing the sample to equilibrate for a minimum of 15 minutes. After the equilibration time, the headspace within the bag will be screened using the PID. The PID screening information will be recorded on the test pit log.

Based on the PID screening and visual/olfactory observations, two soil samples will be collected from each test pit for laboratory analysis. One of the samples will be collected from the fill material that exhibits the highest PID reading and/or exhibit notable or suspect characteristics via visual/olfactory observations. The second sample will be collected from the native soil underlying the fill. Subsurface soil sample analytical parameters will be in accordance with Table 2-1.

2.1.3 Monitoring Well Installations and Sampling

A single groundwater sample collected from MW-11S during the Site-Wide Investigation (O'Brien & Gere, 2007) indicated the presence of polychlorinated biphenyl (PCB) Aroclor 1260 above the New York State Class GA groundwater standard. Monitoring well MW-11S is located downgradient of the Demolition Debris Landfill (Figure 2).

Three additional groundwater monitoring wells will be installed in the shallow sand and gravel unit overlying till at the approximate locations shown on Figure 2. One monitoring well will be located upgradient of the Demolition Debris Landfill and two will be located in proximity to the downgradient toe of the landfill. The purpose of this well placement is to identify upgradient, background groundwater quality in this area, as well as to evaluate the downgradient extent of groundwater impacts.

The monitoring wells will be installed and developed in accordance with the procedures provided in Appendix A-2. During installation, soil samples will be collected at continuous two-foot intervals using split barrel samplers. Each soil sample will be described as to its color, moisture content, density, grain-size distribution, and recovery. This descriptive information will be recorded on test boring logs. Soil samples will be screened for the presence of volatile organic compounds (VOCs) using a portable photoionization detector (PID). The PID screening will be conducted by placing a representative portion of the sample in a plastic zip-lock bag and allowing the sample to equilibrate for a minimum of 15 minutes. After the equilibration time, the headspace within the bag will be screened using the PID. The PID screening information will be recorded on the test boring log.

Based on the PID screening, as well as visual/olfactory observations, two soil samples from the vadose zone will be collected from each monitoring well boring for laboratory analysis. The two samples collected will typically display the highest PID reading and/or exhibit notable or suspect characteristics via visual/olfactory observations.

Subsequent to installation and development, groundwater samples will be collected from the three newly installed monitoring wells and from MW-11S and MW-12S as part of the site-wide groundwater sampling task described in Section 2.12. Groundwater sample analytical parameters will be in accordance with Table 2-1.

2.2 FORMER LANDFILL

The Former Landfill AOC is located along the southern boundary of the SMC Brownfield Site, as shown on Figure 2. This area was reportedly built up over years of operation and facility expansion, and includes soil and debris (*e.g.* concrete, asphalt, scrap metal) that have been placed over the course of plant operations.

During the Site-Wide Investigation, four test pits were excavated within the Former Landfill (see Figure 2 of the RI Work Plan). A layer of black granular non-soil material was encountered in test pit TP-3E from approximately 9.5 feet to 11 feet below grade. A sample of this material indicated PCB Aroclor 1254 and semivolatile organic compound (SVOC) concentrations above the Part 375 Industrial Use Soil Cleanup Objectives.

2.2.1 Surface Soil Sampling

Four surface soil samples will be collected to provide data to evaluate potential exposure pathways. The proposed locations for the surface soil samples are shown on Figure 2. Samples will be collected from the 0 to 2-inch and 0 to 6-inch intervals in accordance with the procedures in Appendix A-4. Surface soil sample analytical parameters will be in accordance with Table 2-1.

2.2.2 Soil Borings and Subsurface Soil Sampling

Up to seventeen soil borings will be advanced within the Former Landfill as shown on Figure 2. Ten of these soil borings will be advanced in the vicinity of TP-3E to evaluate the areal and vertical extent of the black material layer that was previously encountered during the Site-Wide Investigation. Three additional soil borings will be located along the top of the Former Landfill near the boundary with Mud Creek and four other soil borings will be positioned across the Former Landfill.

Subsurface samples will be collected using the Geoprobe® dual-tube soil sampler system equipped with 4-ft long samplers lined with acetate sleeves at each soil boring location. Each soil sample will be described as to its color, moisture content, density, grain-size distribution, and recovery. This descriptive information will be recorded on test boring logs. Soil samples will be screened for the presence of VOCs using a portable PID in accordance with the procedures outlined in Section 2.1, and the PID screening information will be recorded on the associated test boring log.

One soil sample will be collected for laboratory analysis from each of the ten soil borings associated with the area around the black material layer. These soil samples will be collected from an interval approximately two feet below the black material layer to evaluate if impacts to underlying soils have occurred. If the black material layer is not encountered in certain soil borings, the soil sample will be collected from a depth interval that is approximately two feet below the black material layer.

Two soil samples will be collected for laboratory analysis from each of the remaining seven soil borings based on the PID screening, as well as visual/olfactory observations. The two samples collected will be selected based on the highest PID reading and/or exhibit notable or suspect characteristics via visual/olfactory observations. Subsurface soil sample analytical parameters will be in accordance with Table 2-1.

A sample of the black material will also be collected and analyzed for Toxicity Characteristic Leaching Procedure (TCLP) VOCs, SVOCs, PCBs, and metals for waste characterization purposes.

2.3 HISTORIC AND ACTIVE OUTFALL SEDIMENT

Sediment sampling was conducted at historic outfalls (refer to Figure 2 for locations) during the Site-Wide Investigation. Sediment samples collected from historic outfalls OF-4 and OF-5 indicated that various metals and SVOCs were detected at concentrations above NYSDEC Sediment Screening Criteria. In addition, PCB Aroclor 1254 was detected in the OF-5 sediment sample at a concentration potentially above the NYSDEC Sediment Criteria (depending on the total organic content of the soil, which was not previously analyzed).

Groundwater sampling conducted at MW-05S (Figure 2) during the Site-Wide Investigation indicated the presence of PCB Aroclor 1254 above the Class GA groundwater standard. The 2007 sample was collected using hand bailing methods which may have resulted in increased turbidity, potentially increasing the PCB concentration in the sample.

2.3.1 Sediment Sampling

To evaluate the extent of potential impacts associated with historic outfalls OF-4 and OF-5, six sediment sample locations will be proximal to outfall OF-4, and five sediment sample locations will proximal to outfall OF-5, as shown on Figure 2. At each location attempts will be made to collect samples from depth intervals of 0- to 6-inches, 6- to 12-inches, and 1-ft intervals thereafter until refusal. The sediment samples will be collected in accordance with the procedures provided in Appendix A-3. Sediment sample analytical parameters will be in accordance with Table 2-1.

To evaluate the likelihood of PCBs in groundwater near active outfall OF-1, MW-05S will be sampled as part of the site-wide groundwater sampling task. The sample will be collected using low-flow groundwater sampling methods in accordance with the procedures provided in Appendix A-1. Groundwater sample analytical parameters will be in accordance with Table 2-1

Should PCBs be detected in the MW-05S groundwater sample above the NYS Class GA groundwater standard, the need for additional downgradient monitoring wells will be considered and discussed with NYSDEC.

2.4 RINSE WATER/ACID SPILL

Three spills (#0807152, #0807239, and #0807456) were assigned by NYSDEC between September 25 and October 2, 2008 due to releases from a temporary storage tank and leaking pipe union associated with an acid etching waste management process near the southeast corner of the Rolling Plant. These spill incidents were timely reported to NYSDEC by SMC. This area represents the Rinse Water/Acid Spill AOC and is shown on Figure 2. SMC retained GZA Environmental to remove and dispose of pooled acid solution and impacted soil along an abandoned sewer line, and to investigate potential impacts to subsurface soil beneath the interior of the building. Confirmatory sampling subsequent to removal of impacted soil along the abandoned sewer line resulted in no further impacts. Soil samples collected from three borings within the interior of the building indicated arsenic, chromium, and nickel concentrations above Part 375 SCOs for industrial use.

2.4.1 Groundwater Monitoring Well Installation and Sampling

To evaluate potential downgradient migration and impacts to groundwater, two shallow groundwater monitoring wells will be installed south of this spill area at the approximate locations shown on Figure 2. Actual locations will be selected in the field based on subsurface utilities and accessibility of drilling equipment. The monitoring wells will be installed and developed in accordance with the procedures provided in Appendix A-2.

Subsequent to development, the two newly installed monitoring wells will be sampled, as well as existing monitoring well MW-13S, which is considered to be hydraulically downgradient of the Rinse Water/Acid Spill AOC will also be sampled as part of the site-wide groundwater sampling task. The groundwater samples will be collected using low-flow methods in accordance with the procedures provided in Appendix A-1. Groundwater sample analytical parameters will be in accordance with Table 2-1.

2.5 FORMER GENERATOR ROOM

The former Generator Room AOC is located inside the manufacturing building adjacent to and west of the former Furnace #7 area as shown generally on Figure 2. This room historically housed electrical equipment associated with former Furnace #7. The electrical equipment was housed in a basement, and some of this equipment extended above the facility floor; however, no equipment extended beneath the basement floor. According to SMC, the generator room did not house any equipment containing PCB oils, nor were there oil spills in this room. SMC decontaminated and sealed the floors and walls of the former Generator Room basement, and filled the basement with flowable fill. This work was completed during 2007. The former Generator Room, which is currently used for material storage, is accessible through a 10-ft wide chain-link gate and a 10-ft wide by 12-ft high overhead doorway.

2.5.1 Soil borings and Subsurface Soil Sampling

To evaluate potential impacts to soil from the historic use of the former Generator Room, three soil borings will be advanced at the approximate locations shown on Figure 3. This room is used for storage of equipment essential to the operations of the facility. Work within this room presents logistical challenges given the presence of this equipment. The actual locations will be selected in the field based on accessibility of drilling equipment. Based on the depth of PCB impacts associated with the nearby former Furnaces #7 and #8 investigations, the soil borings associated with the former Generator Room will be advanced to approximately 16 feet below the floor surface.

Due to the presence of approximately 10-ft of flowable fill beneath the floor of the former Generator Room, the soil borings will be advanced using fluid rotary methods. A roller bit will be used to create the borehole and potable water will be used as the drilling fluid. Drilling fluid will be circulated from a recirculation tub through the drill stem as the borehole is advanced to remove soil cuttings. Subsurface samples will be collected ahead of the roller bit at continuous 2-ft intervals. Subsurface soil sampling will begin from the bottom of the basement floor underlying the former Generator Room (approximately 10 feet below the current floor level) and continue to a total depth of approximately 16-ft below the current floor level. Samples will be collected using 2-inch split barrel samplers. Sample descriptions, PID screening, and documentation will be completed as described in Section 2.1 of this FAP.

Soil samples from each boring will be placed in appropriate laboratory jars. Two samples per boring (selected based on visual and/or olfactory observations) will be submitted for analysis.

If additional sampling is necessary to further delineate the western extent of impacts from the former Generator Room and former Furnaces #7 and #8, then we will discuss with NYSDEC the feasibility of installing additional soil borings to the west, outside of the manufacturing building.

2.6 FORMER FURNACES #4, #5, #6, #7, AND #8

During a December 15, 2009 site walk-over by NYSDEC, the location, operation, and potential for historic environmental impacts of former Furnaces #1, #2, #3, #4, and #5 was requested. Investigations of former Furnaces #6, #7, and #8 had previously been conducted by Arcadis during 2007and O'Brien & Gere during 2008.

Former Furnace #1 is reported by SMC personnel as a small "table-top" type unit that was located in the former laboratory area of the plant. Its exact historical location is unknown, but was likely located in what is currently used as office space rather than in the current manufacturing space. For this reason, investigation of this furnace is not proposed.

Former Furnaces #2, #3, #4, and #5 were located within the Main Plant, south of former Furnace #6 in the area shown on Figure 3. Based on discussions with plant personnel, former Furnaces #2 and #3 were relatively small furnaces located above the facility floor, with no associated trenches or sumps. Operation of former Furnaces #2 and #3 is not believed to have involved hydraulic oil. For these reasons, subsurface environmental effects are not anticipated to have occurred related to these former furnaces. In addition, the locations of former Furnaces #2 and #3 are currently inaccessible due to active facility operations. Therefore, environmental sampling in the vicinity of former Furnaces #2 and #3 is not proposed.

Former Furnace #4 was also a relatively small furnace. Operation of former Furnace #4 is believed to have involved use of hydraulic oil; however, no trenches or sumps are associated with this furnace. Former Furnace #5 was similar to Furnace #4 in that hydraulic oil was used during operations. During the later operating period of former Furnace #5, a perimeter trench was installed through the floor around this furnace. Given that former Furnaces #4 and #5 used hydraulic oil, these former furnaces have been identified as an AOC, and subsurface investigation will be conducted to the extent practicable given facility operations in these areas.

Former Furnaces #7 and #8 were the largest of the former furnaces and used vacuum induction technology to produce specialty alloys. These furnaces extended below grade. PCB oils were used in the metal melting process. Given that former Furnaces #7 and #8 used PCB oils, these former furnaces have been identified as an AOC. Subsurface investigations have been conducted in this area on two occasions (O'Brien & Gere 2008). Based on the results of prior investigations, subsurface investigation will be conducted to the extent practicable given facility operations and structures in these areas.

2.6.1 Soil Borings and Subsurface Soil Sampling

To evaluate potential impacts to soil from the historic use of former Furnaces #4 and #5, five soil borings will be advanced at the approximate locations shown on Figure 3. The actual locations will be selected in the field based on accessibility for drilling equipment. It is important to note that the locations of these former furnaces are within active manufacturing areas of the facility. Based on the depth of PCB impacts associated with the nearby former Furnaces #6, #7, and #8 investigations, the soil borings associated with former Furnaces #4 and #5 will be advanced to approximately 16 feet below the floor surface.

To evaluate potential impacts to the east of former Furnaces #7 and #8, three soil borings will be advanced at the approximate locations shown on Figure 3. Delineation of the extent of impacts north of former Furnaces #7 and #8 is considered complete based on the results of the previous investigation work conducted by Arcadis and O'Brien & Gere (O'Brien & Gere 2008). The proposed borings associated with the former Generator Room located west of former Furnaces #7 and #8 (see Section 2.5) will be used to evaluate potential impacts of former Furnaces #7 and #8 to the west. Likewise, the proposed soil borings associated with former Furnaces #4 and #5 located south of former Furnaces #6, #7, and #8 will be used to evaluate potential impacts from former Furnaces #7 and #8 to the south. It is important to note that the locations of former Furnaces #7 and #8 are within active manufacturing areas of the facility, and therefore, the actual boring locations will be selected in the field based on accessibility for drilling equipment. The soil borings east of former Furnaces #7 and #8 will be advanced to approximately 16 feet below the floor surface.

The soil borings will be advanced using direct push drilling methods. Subsurface samples will be collected using the Geoprobe® dual-tube soil sampler system equipped with 4-ft long samplers lined with acetate sleeves. Sample descriptions, PID screening, and documentation will be as described in Section 2.1 of this FAP.

Soil samples representing depth intervals of 0 to 2-ft, 4 to 6-ft, 8 to 10-ft, 12 to 14-ft, and 14 to 16-ft will be placed in appropriate laboratory jars and submitted for analysis. Subsurface soil sample analytical parameters will be in accordance with Table 2-1.

2.7 NORTH DRAINAGE SWALE

During the December 15, 2009 site walk-over, NYSDEC requested that potential impacts to the North Drainage Swale be evaluated. The North Drainage Swale conveys surface run-off from upland areas north of the facility. This run-off flows to the east toward historic outfall OF-5, and west to historic outfall OF-4. The North Drainage Swale AOC is shown on Figure 2.

2.7.1 Sediment Sampling

To evaluate potential impacts associated with the North Drainage Swale, four locations will be sampled at the approximate areas shown on Figure 2. At each location, attempts will be made to collect samples from depth intervals of 0- to 6-inches, 6- to 12-inches, and 1-ft intervals thereafter until refusal. The sediment samples will be collected in accordance with the procedures provided in Appendix A-3. Sediment sample analytical parameters will be in accordance with Table 2-1.

2.8 PILOT PLANT EXTERIOR BUILDING FOUNDATION STAINING

During the December 15, 2009 site walk-over, staining was observed on a portion of the southern exterior foundation of the Pilot Plant building (Figure 2). SMC indicated that the staining was likely attributed to compressor blow-down and will further address this AOC per NYSDEC's request.

2.8.1 Surface Soil Sampling

To evaluate potential impacts to soil from the building foundation staining, two surface soil samples will be collected along the exterior building foundation adjacent to this staining. The locations of the surface soil samples will be biased toward areas of the foundations exhibiting the heaviest staining and/or stained/distressed vegetation at the ground surface, if observed. In addition, three surface soil samples will be collected south of the Pilot Plant, as shown on Figure 2, to provide data to evaluate potential exposure pathways. Surface soil samples will be collected from the 0 to 2-inch and 0 to 6-inch intervals in accordance with the sampling procedures provided in Appendix A-4. Surface soil sample analytical parameters will be in accordance with Table 2-1.

2.8.2 Soil Borings and Subsurface Soil Sampling

Three soil borings will be advanced south of the Pilot Plant as shown on Figure 2. The soil borings will be advanced approximately 5 feet into the underlying till layer. Subsurface samples will be collected using the Geoprobe® dual-tube soil sampler system equipped with 4-ft long samplers lined with acetate sleeves at each soil boring location. Each soil sample will be described as to its color, moisture content, density, grain-size distribution, and recovery. This descriptive information will be recorded on test boring logs. Soil samples will be screened for the presence of VOCs using a portable PID in accordance with the procedures outlined in Section 2.1, and the PID screening information will be recorded on the associated test boring log.

Two soil samples will be collected for laboratory analysis from each soil boring. One sample will be collected from the sand and gravel overlying the till, and the second sample will be collected within the till. Subsurface soil sample analytical parameters will be in accordance with Table 2-1.

2.9 PILOT PLANT DRAINAGE SWALE

During the December 15, 2009 site walk-over, a drainage culvert extending beneath the perimeter road southwest of the Pilot Plant (Figure 2) was observed by NYSDEC. This drainage culvert directs storm water from the Pilot Plant roof drains, and upgradient blacktop areas and a surficial depression located near the Pilot Plant, toward Mud Creek. As such, this area is included in the investigation at NYSDEC's request.

2.9.1 Sediment Sampling

To evaluate potential impacts associated with this drainage feature, sediment at three locations will be sampled at the approximate locations shown on Figure 2. One sediment sample location will be upstream of the drainage culvert, one at the outlet of the drainage culvert, and another further downgradient from the drainage culvert outlet based on field observations at the time of sampling. The actual locations will be biased toward areas exhibiting observable staining or distressed vegetation at the ground surface, if observed. At each location, attempts will be made to collect samples from depth intervals of 0 to 6-inches, 6 to 12-inches, and 1-ft intervals thereafter until refusal. The surface soil sampling procedures provided in Appendix A-4 will be followed. Sediment sample analytical parameters will be in accordance with Table 2-1.

2.10 MUD CREEK

Surface water and sediment sampling was conducted within Mud Creek during the Site-Wide Investigation. Several metals were detected in the three surface water samples collected from Mud Creek. The detected concentrations were below the corresponding NYS Ambient Water Quality Standards for Class C surface water bodies, where available. One SVOC and several metals were detected in Mud Creek sediment at concentrations above NYSDEC Sediment Screening Criteria. PCBs were not detected in the sediment samples.

2.10.1 Surface Water Sampling

Five surface water samples will be collected at the approximate locations shown on Figure 2. The western-most location will serve to represent background conditions of upstream water quality. The eastern-most location will serve to represent surface water quality flowing off the SMC Brownfield Site. The remaining surface water sample locations will allow evaluation of potential impacts from the Former Landfill. The surface water samples will be collected in accordance with the procedures provided in Appendix A-3. Surface water sample analytical parameters will be in accordance with Table 2-1.

2.10.2 Sediment Sampling

Eleven locations will be sampled from the bed of Mud Creek at the approximate locations shown on Figure 2. At each location, attempts will be made to collect sediment samples from depths of 0 to 6 inches, 6 to 12 inches, and 1-ft intervals thereafter until refusal. The sediment samples will be collected in accordance with the procedures provided in Appendix A-3. Sediment sample analytical parameter will be in accordance with Table 2-1.

2.11 ADDITIONAL SURFACE SOIL SAMPLING

In addition to the surface soil samples collected specific to AOCs discussed in sections above, surface soil samples will be collected from four additional areas outside of the SMC Brownfield Site as shown on Figure 2. Specifically, two surface soil samples will be collected from a grassy area east of the SMC Brownfield Site, two from grassy areas near the Office Area, and two from grassy areas on each side of the entrance drive to the facility. In addition, three surface soil samples will be collected from grassy areas where the SMC property abuts the residential property. Data from these surface soil samples will be used to evaluate potential human exposure pathways and potential ecological exposure pathways.

At each location, surface soil samples will be collected from depths of 0 to 2-inches and 0 to 6-inches in accordance with the procedures provided in Appendix A-4. Surface soil sample analytical parameters will be in accordance with Table 2-1.

2.12 SITE-WIDE GROUNDWATER ELEVATION MONITORING AND SAMPLING

Groundwater elevations will be recorded from each monitoring well present within the boundary of the SMC Brownfield Site and within the SMC property boundary, including existing wells monitored as part of the former Surface Impoundment Area, those installed during the 2007 Site-Wide Investigation, and new wells installed as part of the RI. Groundwater levels will be measured from surveyed reference marks on each well casing using an electronic water level probe. The water level measurements will be converted to elevations and will be used to prepare groundwater flow maps and to evaluate the hydraulic gradient(s) across the SMC Brownfield Site.

Following the groundwater elevation monitoring, groundwater samples will be collected from each monitoring well (9 former Surface Impoundment wells, 13 existing wells, and 5 newly installed wells). Groundwater samples will be collected using low-flow purge and sample methods in accordance with the procedures provided in Appendix A-1. Groundwater sample analytical parameters will be in accordance with Table 2-1.

2.13 HYDRAULIC CONDUCTIVITY TESTING

Hydraulic conductivity testing will be conducted at the monitoring wells included in the monitoring well network within the SMC Brownfield Site and the SMC property boundary. The hydraulic conductivity test data will be used to provide estimates of the permeability of the overburden water-bearing formations. The data will also be used, in conjunction with hydraulic gradient and porosity information, to estimate ground water velocities that have a bearing on the potential migration rate of constituents.

These tests involve observing the recovery of water levels toward an equilibrium level after an initial induced rise or fall in water level. During a hydraulic conductivity test, a 5-foot inert rod (slug) will be quickly introduced into the well to induce a water level rise. Following equilibration of the water level, the slug is removed to lower the water level. Procedures and equipment requirements for hydraulic conductivity testing are provided in Appendix A-5.

2.14 SAMPLE AND FIELD EQUIPMENT HANDLING

Sample and field equipment will be handled in accordance with the Quality Assurance Project Plan (QAPP) provided in Appendix B of the RI Work Plan.

2.15 SURVEY OF SAMPLING LOCATIONS

Each of the sampling locations will be surveyed by a New York State licensed surveyor for horizontal and vertical control and will be incorporated into the SMC Brownfield Site base map. Horizontal positions of the new monitoring wells and soil borings, and sediment and surface soil sample locations will be tied into the New York State Plane Coordinate System. Horizontal accuracy will be 0.01-ft. Vertical elevations will be relative to mean sea level, 1929 General Adjustment. Monitoring wells will be surveyed to the nearest 0.01 feet at the top of the wells riser pipe (measuring point) and top of protective steel casing. Ground surface at each location will also be surveyed to the nearest 0.1 feet.

2.16 EQUIPMENT DECONTAMINATION PROCEDURES

2.16.1 Drilling and Excavating Equipment

Split spoon and/or direct-push samplers will be decontaminated after each use using a non-phosphate detergent wash followed by a potable water rinse. The decontamination water will be periodically changed during the drilling program. These decontamination fluids will be transferred to 55-gallon drums.

After the completion of each well borehole, the hollow stem augers, drill rods, and other miscellaneous drilling tools will be decontaminated using a high-pressure steam cleaner. This decontamination will be conducted on a temporary decontamination pad such that the decontamination fluids can be collected and transferred to 55-gallon drums.

After the completion of each test pit, the excavator bucket will be decontaminated using a high-pressure steam cleaner. This decontamination will be conducted on a temporary decontamination pad such that the decontamination fluids can be collected and transferred to 55-gallon drums.

2.16.2 Groundwater, Surface Water, and Sediment Sampling Equipment

Dedicated sampling equipment, which will not require decontamination, will be utilized for sampling these media.

2.17 QUALITY ASSURANCE / QUALITY CONTROL

Quality assurance/quality control issues associated with this project are addressed in the QAPP developed for this program. The QAPP is provided in Appendix B of the RI Work Plan.

2.18 HEALTH AND SAFETY

Health and safety issues associated with this project are addressed in the Health and Safety Plan (HASP) developed for this program. The HASP is provided in Appendix C of the RI Work Plan.

3. HANDLING OF INVESTIGATION-DERIVED WASTE (IDW)

The RI activities will produce investigation-derived wastes (IDW) which will require appropriate management. IDW includes the following:

- Drill cuttings
- Groundwater resulting from development of new monitoring wells
- Groundwater resulting from the sampling of the monitoring wells
- Decontamination fluids resulting from decontamination of the drill rig and sampling equipment
- Personnel protective equipment (PPE).

The management of these materials will be in accordance with Section IV of Technical and Administrative Guidance Memorandum (TAGM) 4032 (NYSDEC, November 21, 1989). Specific IDW handling is discussed below.

3.1 DRILL CUTTINGS

Drill cuttings generated during the installation of monitoring wells will be temporarily placed in 55-gallon drums as the cuttings are generated during the drilling process. The drums will be temporarily staged at a location on the SMC property specified by SMC until the drum contents are characterized and can be properly disposed.

3.2 GROUNDWATER

Groundwater produced during development and sampling activities will be temporarily placed in 55-gallon drums as the water is generated. The drums will be temporarily staged at a specified location on the SMC property until the drum contents are characterized and can be properly disposed.

3.3 DECONTAMINATION FLUIDS

For equipment requiring decontamination (e.g., augers, drill rods, and other drilling tools), this will take place on a temporary decontamination pad. Decontamination of other equipment, such as sampling equipment, will take place at the work location, with the decontamination fluids being contained in 5-gallon buckets. Decontamination fluids produced during the decontamination of drilling and sampling equipment will be transferred to drums. The drums will be temporarily staged at a location on the SMC property until the drum contents are characterized and can be properly disposed.

3.4 PPE AND GENERAL REFUSE

Used PPE and other general refuse will be placed in trash bags and disposed of in appropriate waste receptacles.

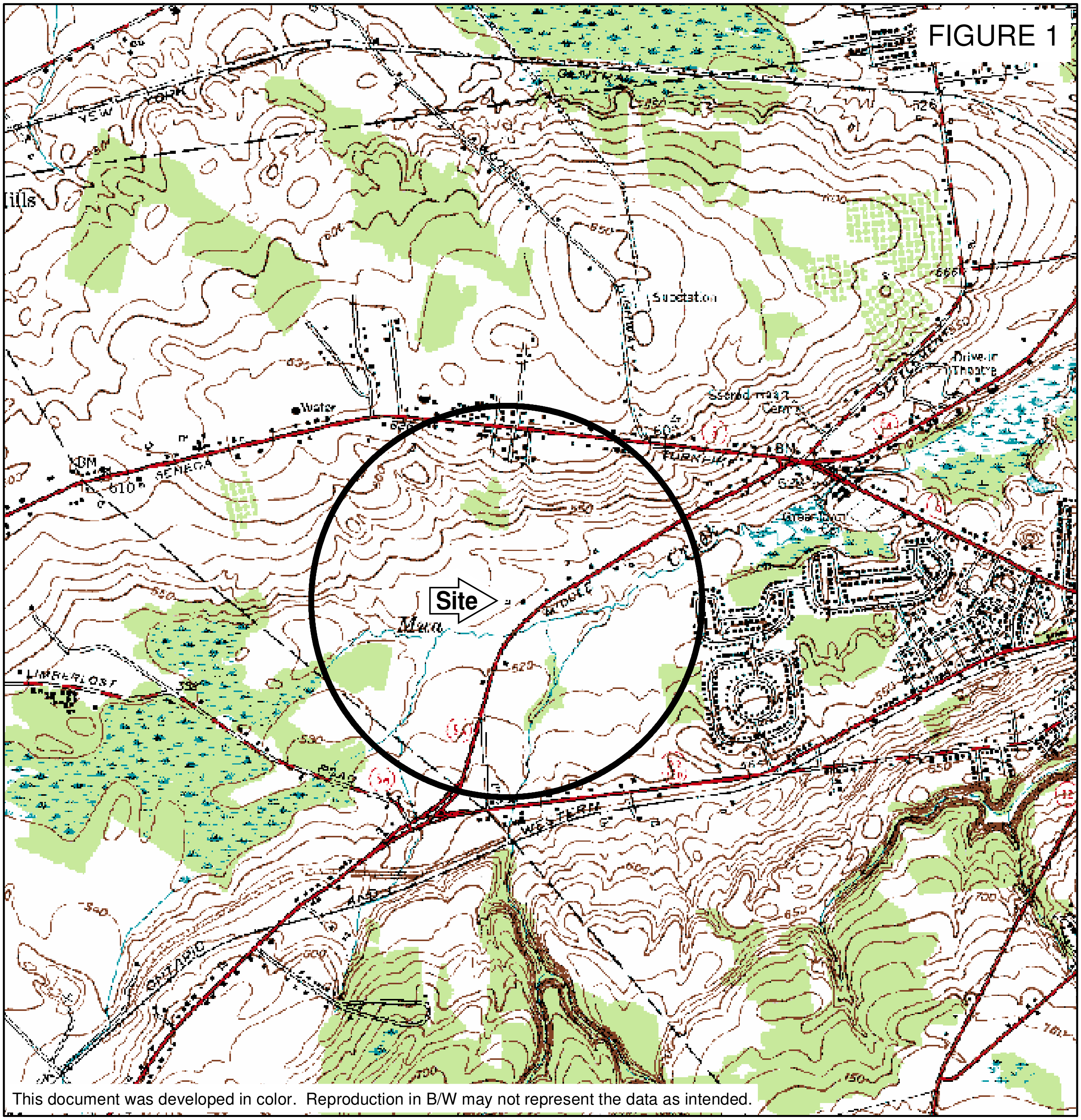
3.5 WASTE CHARACTERIZATION ANALYSIS

At the conclusion of field activities, the soil cuttings, ground water, and decontamination fluids will be appropriately characterized and, after receiving the necessary approvals, will be transported for treatment and/or disposal at a permitted facility. It is anticipated the waste characterization of solid samples (soil cuttings) and liquid samples (*e.g.* ground water and decontamination fluids) will be based on soil and ground water analytical data obtained during RI activities.

T:\SMC\SITE_LOC.mxd

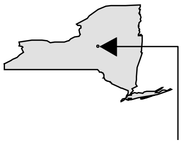
PLOT DATE: 06/20/07 DIV 71 LSR

FIGURE 1



This document was developed in color. Reproduction in B/W may not represent the data as intended.

ADAPTED FROM: UTICA WEST USGS QUADRANGLE


QUADRANGLE LOCATION

SPECIAL METALS CORP.
4317 MIDDLE SETTLEMENT RD.
NEW HARTFORD, NEW YORK

SITE LOCATION

0 1,000 2,000 4,000 6,000 8,000

Feet

1:24,000

FILE NO. 2290

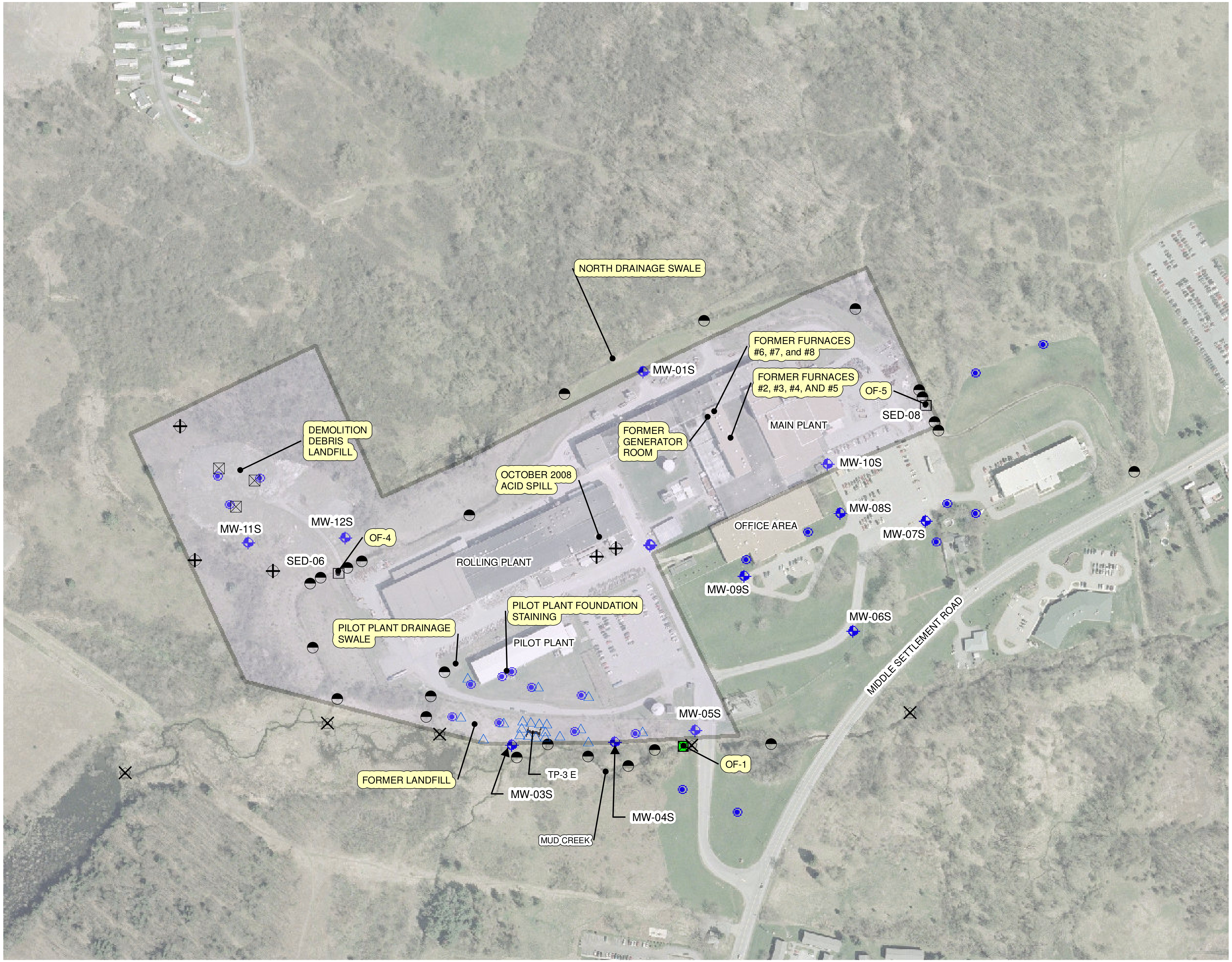
DECEMBER 2009

O'BRIEN & GERE

PATH: T:\SMC\RI Work Plan Figs\BCP Proposed RI Sample Locs_REV_1.mxd

NAME: CarnevDJ

DATE: 5/20/2011 10:04:31 AM



This document was developed in color. Reproduction in B/W may not represent the data as intended.

FIGURE 2

Legend

☒	PROPOSED TEST PIT
⊕	PROPOSED MONITORING WELL (SAND AND GRAVEL UNIT)
△	PROPOSED SOIL BORING
◓	PROPOSED SEDIMENT/SOIL SAMPLE (TO BE DETERMINED)
✕	PROPOSED SURFACE WATER AND SEDIMENT SAMPLE
◉	PROPOSED SURFACE SOIL
⊡	HISTORIC OUTFALLS
🟩	ACTIVE OUTFALL
—	HISTORIC TEST PIT
⊕	MONITORING WELL (SAND & GRAVEL UNIT)
▭	SMC BROWNFIELD SITE (42 ACRES)
FORMER LANDFILL	AREA OF CONCERN

SPECIAL METALS CORP.
4317 MIDDLE SETTLEMENT RD.
NEW HARTFORD, NEW YORK

PROPOSED RI SAMPLE LOCATIONS - EXTERIOR

0 150 300 600
Feet

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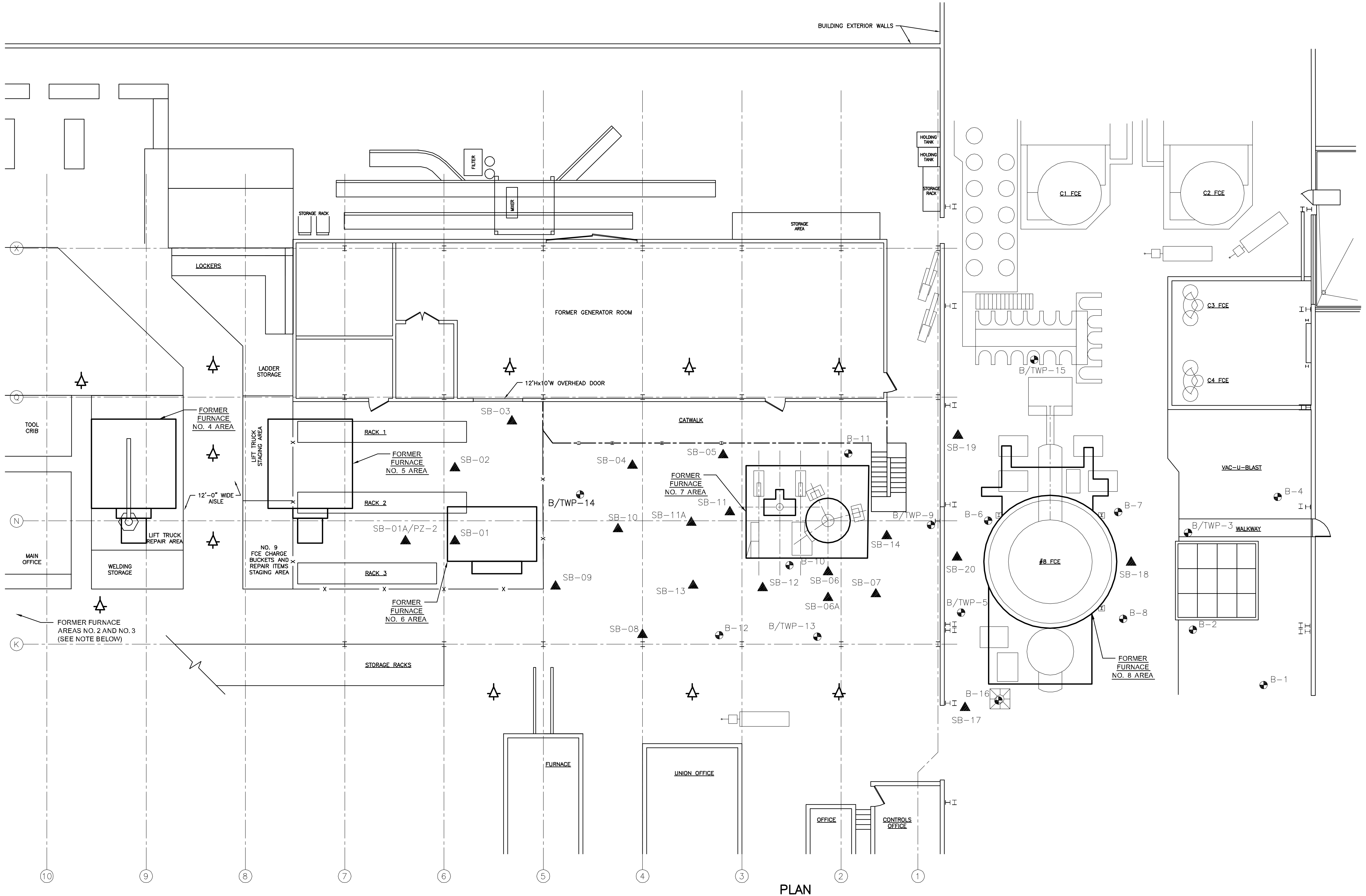
FIGURE 3



PLAN

SCALE: 1"=10'-0"

NOTE:

FORMER FURNACE AREAS NO. 2 AND NO. 3 WERE LOCATED APPROXIMATELY 20 – 40 FEET SOUTH OF COLUMN LINE 10.

LEGEND

△	PROPOSED RI SOIL BORING
▲	2008 SOIL BORING.
◐	2007 SOIL BORING, OR TEMPORARY WELL POINT.
——x——	EXISTING FENCE

SMC BROWNFIELD SITE
RI WORK PLAN

PROPOSED RI
SAMPLE LOCATIONS
INTERIOR

1"=10' 10 0 10

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FEBRUARY 2010

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Low-Flow Groundwater Sampling Procedures

Appendix A-1: Low-Flow Groundwater Sampling Procedures

Prior to commencing sampling activities, the groundwater quality monitoring probes/meters including pH, conductivity, oxidation-reduction potential (ORP), dissolved oxygen, and turbidity will be calibrated daily in accordance with the manufacturer's instructions. At a minimum, two-point calibrations will be conducted for pH, conductivity, and turbidity. The dissolved oxygen probe will be checked against a zero-dissolved oxygen solution. Calibration results will be recorded in the field log notebook.

The following describes the low-flow purging and sampling procedures:

1. Don a new pair of gloves.

2. Prepare the pumping system for operation. A bladder pump capable of fitting within a 2-inch diameter well will be used. Connect the tubing to the in-line, water quality parameter meter.

3. Commence well purging by low flow pumping from the well. The flow rate shall not exceed 0.5 liters/min. Initially, a flow rate between 200 ml/min and 500 ml/min will be used. Efforts should be made to minimize the generation of air bubbles in the sample tubing by either increasing the flow rate as appropriate, or restricting the flow by clamping the tubing. Record purge rate on the Low-Flow Groundwater Sampling Log. An example of the Low-Flow Groundwater Sampling Log to be utilized during this project is provided at the end of this protocol.

4. During purging, monitor and record pH, specific conductivity, temperature, ORP, dissolved oxygen, turbidity, water levels, and purged volume at time intervals sufficient to evacuate the volume of the flow-through cell. This time interval can be calculated by dividing the volume of the flow through the cell by the pumping rate.

5. Well sampling can commence after equilibration of water quality parameters. Equilibrated trends are generally obvious and usually follow either an exponential decay or asymptotic trend during purging. The equilibration guidelines are as follows:

Temperature	± 3% of measurement
pH	± 0.1 pH units
Specific conductance	± 3% of measurement
ORP	±10 mV
DO	±10% of measurement
Turbidity	± 10% of measurement

   If the indicator field parameters have not equilibrated within the above specified limits after 4 hours of purging, then one of the following options may be taken: 1) continue purging until stabilization is achieved; or 2) discontinue purging and collect samples (document attempts to achieve stabilization). Record total volume of water purged and purging time on the Low-Flow Groundwater Sampling Log for future reference.

   Ideally, drawdown in the well should not exceed 0.3 ft. Pumping rates should, if needed, be reduced to the minimum capabilities of the pump to avoid pumping the well dry and/or allow stabilization of indicator parameters. If the recharge rate of the well is very low and it appears that the well will be purged dry, the pump should be shut down prior to purging the well dry. Sampling should commence as soon as the well has recharged to a sufficient level to collect the appropriate volume of samples. Sample collection using bailing techniques may be used in this situation. However, turbidity levels shall be maintained as low as possible.

6. Remove the sampling bottles from their transport containers, and prepare the bottles for receiving samples. Inspect all labels to insure proper sample identification. Sample bottles should be kept cool with their caps on until they are ready to receive samples. Arrange the sampling containers to allow for convenient filling.

7. Sample bottles for VOC analyses will be filled completely so that there is no headspace or bubbles. The VOC sample vials will be examined for proper filling by inverting the vials immediately after filling to check for the presence of headspace or bubbles. If headspace or bubbles are observed, the vial(s) will be discarded and additional sample(s) will be collected.

8. After the last sample has been collected, record the date and time.

9. Begin preparing the Chain of Custody documentation.

Monitoring Well Installation and Development Procedures

Appendix A-2: Overburden Well Installation and Development Procedures

Overburden wells

Drilling for the overburden monitoring well installations will be conducted using a truck-mounted drill rig. The boreholes will be advanced using 4¼-inch inside diameter (I.D.) hollow stem augers with continuous soil sampling.

The overburden monitoring wells will be constructed as 2-inch diameter schedule 40 PVC wells consisting of a 10-ft length of 0.010-inch slot screen flush-threaded to riser casing. The riser casings will be extended to ground surface. A sandpack suitable for use with a 0.010-inch slot screen will be installed within the annular space between the borehole and the well. The sandpack will extend from the bottom of the well to 1-ft to 2-ft above the top of the well screen. A minimally 2-ft thick bentonite seal will be installed in the annular space above the sand pack. The remaining annular space will be filled with a Portland cement/bentonite grout. The grout will extend to approximately 1-ft below grade. Approximately 0.5-ft of sand will be placed on top of the grout. Wellhead completion will include the installation of a flush mounted protective casing/road box. A concrete pad will be installed around the well to direct surface runoff away from the top of the wellhead.

The soil cuttings generated during the drilling process will be managed according to Section 3 of the FAP.

Well development

The newly installed monitoring wells will be developed no sooner than 24 hours following installation. Well development will consist of alternately surging and pumping each well to remove the fine material which may have settled in the monitoring wells, to remove introduced drilling fluids, and to provide better hydraulic communication with the surrounding formation. A development goal where temperature, conductivity, and pH have stabilized and a turbidity of 50 Nephelometric Turbidity Units (NTUs) has been achieved will be established. If this goal cannot be achieved within a reasonable timeframe, the O'Brien & Gere Project Manager will be notified, and discussions will be implemented with NYSDEC to establish a mutually agreeable development volume.

Development water will be managed in accordance with Section 3 of the FAP.

Surface Water and Sediment Sampling Procedures

Appendix A-3: Surface Water and Sediment Sampling Procedures

Surface Water

- Water depths will be obtained at each water sample location.
- Surface water samples will be collected from the most downstream location proceeding to the most upstream location.
- A new pair of clean disposable latex or nitrile gloves will be donned at each sampling location.
- The water column samples will be collected facing upstream in flowing surface water systems.
- For water depths less than two feet, a surface water sample will be collected by submerging a sample bottle below the water surface taking care not to overfill the sample bottle and expelling the sample preservatives.
- For water depths between two and four feet, a water column sample will be collected using a Kemmerer® sampler submerged below the water surface to a depth of 60% of the total depth. The surface water sample will then be transferred from the Kemmerer® sampler to the laboratory sample containers.

Sediment Sampling

- At each sediment sampling location, attempts to collect samples from depth intervals of 0 to 6-inches, 6 to 12 inches, and 1-ft intervals thereafter until refusal will be conducted.
- Sediment samples will be collected from the most downstream location proceeding to the most upstream location.
- A new pair of clean disposable latex or nitrile gloves will be donned at each sampling location.
- If sediment sample location is beneath a surface water column, prepare a new, dedicated 2-inch diameter Lexan tube, the length of which will be determined based on the depth to sediment below the surface water.
    - Place a tight fitting cap or expandable plug on top of the tube prior to lowering the tube through the surface water column to minimize the amount of water within the tube.
    - Once at the sediment surface, remove the cap or plug and push the tube into the sediment to the point of refusal.
    - Once the sediment has been penetrated, place the cap or plug over the top of the tube to create a vacuum as the tube is retrieved.
    - Measure the recovered length of sediment.
    - Depending on the length of recovery, extrude each sample interval individually from the tube into dedicated, disposal aluminum pans such that the required samples can be collected.
    - Collect VOC samples directly from the extruded sediment.
    - Homogenize the remaining sediment by mixing thoroughly with a dedicated disposable scoop and fill the remaining sample botlles.
- If the sediment location is free of surface water, use a disposable scoop or hand auger to collect the sample.
- Transfer the sediment into a dedicated, disposal aluminum pan and homogenize the sediment sample by mixing thoroughly with a dedicated disposable scoop.
- Subsequent to homogenization, transfer the sediment to the appropriate sample jars.

- After the sample jar is filled, cap the jar and follow the COC procedures.
- Observations related to the color, grain-size, and any visual and/or olfactory signs of contamination shall be recorded in the field logbook. In addition, the length of the surface water column at each sampling location shall be recorded.
- QA/QC samples will be collected as specified on Table 1 of the QAPP.

Surface Soil Sampling Procedures

Appendix A-4: Surface Soil Sampling Procedures

Surface soil samples may be either discrete or composite:

Discrete sample represents a single location in the soil column. This type of sample is also used for discrete analysis of surface soil conditions. Discrete soil samples are collected from near surface soils at locations identified in a work plan. Hand augers, disposable scoops, hand trowels, or shovels are used to collect these samples.

Composite sample represents a mixture of soils from more than one location or depth. Compositing procedures are inappropriate for samples that will be analyzed for VOCs because agitation of the sample may result in a loss of part of the volatile fraction of the sample.

Use the following procedure to collect a sample:

1. If necessary, penetrate the soil to the appropriate sampling depth.

2. If applicable, screen the area to be sampled using a PID or another appropriate screening device, and record readings in the field log. A PID is used to screen samples for two reasons:

    - To furnish a field safety measure (ambient air screening)
    - To select potentially affected soil samples (headspace screening)

    The operator of the PID must be experienced in its use and aware of how factors such as temperature, humidity, or methane affect the instrument's readings.

3. Using a clean tool, remove and discard a thin layer of soil from the area. Record the characteristics of the soils including grain size, content, staining, and color.

4. To collect a discrete soil sample for VOC analysis, use a dedicated, disposable scoop, or its equivalent. Immediately place the VOC sample into the appropriate sample container. Soil samples for VOC analysis are not to be mixed or homogenized. Continue sampling for other parameters. Subsequent samples may be homogenized for the remaining, non-VOC analyses. Homogenization will be conducted using dedicate, disposable plastic scoops and dedicated, disposable aluminum pans.

5. Place the homogenized sample into appropriate sample containers. In addition to analytical samples, a reference sample considered representative of the soil may also be collected in a wide mouth jar and stored for possible future physical analyses such as grain size analysis.

6. Check that the cap of each sample container has a Teflon liner, if required for the analytical method. Secure the cap tightly.

7. Label the sample bottle with the appropriate sample tag. The tags could be permanent labels or clean tape. Label the tag carefully and clearly using indelible ink. Complete appropriate sampling forms and record in the field log book. Pre-labeled bottles are handy, particularly if you are wearing gloves or if the weather is inclement.

8. Initiate chain-of-custody procedures per the QAPP.

9. Place the sample containers on ice in a cooler to maintain the samples at approximately 4°C. Ship the cooler to the laboratory for analysis within 48 hr of sample collection.

10. Clearly mark each location from which you collected the sample. Use a stake or flag displaying the sample number.

Hydraulic conductivity Test Procedures

Appendix A-5: Hydraulic Conductivity Test Procedures

These tests involve observing the recovery of water levels toward an equilibrium level after an initial perturbation. The perturbation may be either a sudden rise or fall in water level. During a slug test, a 5-foot inert rod will be quickly introduced into the well to cause a water level rise. Following equilibration of the water level the slug is removed to lower the water level. Procedures and equipment requirements may vary depending on the rate of the water-level recovery. Each well will be tested in accordance with the following procedures:

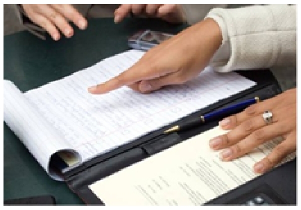
1. Determine the type of test to be performed based on the following:
    - If the screened interval of the well straddles the water table, only use a rising head test;
    - If the screened interval of the well is submerged within water, then a rising and falling head test will be conducted
2. Record appropriate initial data in field notebook, including date of test, well identification, well construction details (i.e., screen length, screen diameter, riser diameter, depth to top of screen, sand pack length, sand pack diameter, and depth to top of sand pack), type of test and names of field personnel.
3. Clean the downhole equipment (e.g., pressure transducer, associated cable and, if used, the bailer or slug and associated line) following standard decontamination procedures before initiating test(s) at each well.
4. Measure and record the static water level in the well (only wells which have fully recovered to static level conditions after drilling and development should be tested).
5. Connect the pressure transducer to the data logger and lower the transducer into the well to a depth that will not interfere with the insertion of the slug but does not exceed the operating range of the transducer. Secure the position of the transducer by clamping the transducer cable to the well casing using a rubber-covered clamp. If the edges of the well casing are sharp, cover them with cloth or duct tape to protect the transducer cable.
6. Quickly create the water level perturbation by inserting the slug into the well. While there is no fixed requirement for the magnitude of the change in water level, it is suggested that a minimum of 20% instantaneous hydraulic head differential be created to allow collection of a suitable database.
7. If another test is to be performed, allow the well to re-equilibrate prior to performing the next test. Repeat the procedures, changing settings as appropriate.

Interpretation of water level versus time data from the hydraulic conductivity tests will be performed using the Bower & Rice method. Other appropriate methods may be utilized, and if deemed necessary.

QUALITY ASSURANCE PROJECT PLAN







Brownfield Cleanup Program
Remedial Investigation
SMC Brownfield Site
New Hartford, New York
Site No. C633016

Special Metals Corporation

May 2011

O'BRIEN & GERE

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1. INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been developed by O'Brien & Gere for the Remedial Investigation (RI) to be conducted at the Special Metals Corporation (SMC) Brownfield Site located in New Hartford, New York.

This QAPP presents the RI objectives and quality assurance/quality control (QA/QC) activities associated with sampling and analysis of environmental samples collected during the RI. The procedures in this QAPP will be followed by field personnel responsible for the collection of environmental samples and laboratory personnel responsible for the analysis of environmental samples.

2. PROJECT DESCRIPTION

This section describes the general scope of work and project objectives for the activities to be performed during the RI. Additional information is presented in the Field Activities Plan (FAP).

2.1 PROJECT OBJECTIVES AND SCOPE

The project tasks and objectives associated with sample collection and analysis are provided in the FAP. The RI consists of collection and analysis of ground water, surface and subsurface soil, and sediment.

Table 1 presents the analytical methods, sample collection containers and volumes, preservation, holding times and associated quality control sample frequency for this RI.

The ground water, surface and subsurface soil, surface water, and sediment results will be compared to the following screening criteria, where applicable:

- Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (6 NYCRR Part 375) – Remedial Program Soil Cleanup Objectives
- Part 703 – Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations – New York State Class GA Groundwater Standards
- NYSDEC Technical Guidance for Screening Contaminated Sediments

2.1.1 Laboratory Analysis

Sample analyses and analytical methods to be utilized in this RI are listed in Table 1. The target analytes are listed in Tables 2-1 through 2-9.

The QC requirements and corrective actions listed in Tables 3-1 through 3-5, which supplement the method requirements, are to be followed by the laboratories during the RI.

The laboratory will report non-detected sample results to the method detection limits (MDLs). For the remaining data, results that are less than the quantitation limits (QLs) but greater that the MDLs will be reported by the laboratories using the "J" flag. The QLs and MDLs listed in Tables 2-1 though 2-9, or the most recent MDLs and QLs, will be reported by the laboratories on the sample result sheets. The tables also present the applicable screening criteria, which will be used to evaluate the analytical data.

The laboratories will provide sample containers and canisters for the investigation prepared in accordance with USEPA requirements.

Communications with O'Brien & Gere will be documented by the laboratories in the data packages.

The analytical data will be reported in New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocol (ASP) Category B deliverable format, including the forms described in the NYSDEC guidance, in both hardcopy and electronic data format, for data generated.

2.1.2 Data Validation

Data validation will be performed on the data collected for the RI utilizing the NYSDEC DUSR guidance (NYSDEC, 2002). O'Brien & Gere data validators will provide data validation services.

Data will be evaluated during validation using the QA/QC criteria established in the methods, the quality control requirements and corrective actions listed in Tables 3-1 through 3-5, and laboratory established control limits.

Data affected by excursions from the previously described QA/QC criteria will be qualified using USEPA Region II data validation guidance and professional judgment. The application of these validation guidelines will be modified to reflect method and QAPP requirements, where applicable.

Upon request of the data validator, the laboratory will provide additional or supplemental information within three working days of the request during the validation process.

The specific data quality requirements including precision, accuracy, representativeness, completeness, comparability, and sensitivity will be assessed during data validation. Data usability with respect to the data quality objectives (DQOs) and data uses will be compared to the project requirements. In the event that the completeness objective of 95 percent is not achieved, samples will be recollected at the discretion of the O'Brien & Gere Project Manager.

The laboratory will provide two copies of the data packages and the electronic deliverables within 21 days from the receipt of the last sample at the laboratory.

2.1.3 Audits

At the discretion of the Project Manager, one field audit and one laboratory audit may be performed during the RI. Additional audits may be required if issues that would severely limit the use of the sample data are identified during the investigation. Corrective action procedures will be implemented based on unacceptable audit results, as defined herein.

2.1.4 Documentation

Data will be managed in a relational data base management system (DBMS). Laboratory analytical data will be provided in electronic disk deliverable (EDD) format for direct upload into the DBMS. The EDD will conform to guidelines specified by NYSDEC. Information on the format of data submissions can be found at http://www.dec.ny.gov/chemical/62440.html.

Data validation qualifiers will be entered into the DBMS by hand and checked independently.

Records will be incorporated into the final project files for the samples. The field logs, data packages, and records will be included in the project files, which will be archived by O'Brien & Gere for a period of 10 years.

3. DATA QUALITY OBJECTIVES AND CRITERIA

DQOs are quantitative and qualitative statements specifying the quality of the environmental data required to support the decision making process. DQOs define the total acceptable uncertainty in the data for each specific activity conducted during the investigation. The uncertainty includes both sampling error and analytical error. Ideally, zero uncertainty is the intent. However, the variables associated with the process (field and laboratory) inherently contribute to the uncertainty of the data. It is the overall objective to keep the total uncertainty within an acceptable range that will not hinder the intended use of the data. The QA/QC requirements have been established such that there will be a high degree of confidence in the measurements.

Environmental data will be compared to the following New York State screening values where applicable:

- Water data will be compared to applicable screening values provided in TOGS 1.1.1 (NYSDEC 1998).
- Soil data will be compared to applicable screening values provided in Part 375 (NYSDEC 2006).
- Sediment data will be compared to applicable screening values provided in the Technical Guidance for Screening Contaminated Sediments (NYSDEC 1999).

3.1 FIELD SAMPLING

The objective of field sampling procedures is to obtain samples that represent the environmental matrix being investigated. This will be accomplished through the use of proper sampling techniques and equipment as presented in the Work Plan.

Certain field investigation activities do not require sample collection, but nonetheless involve measurements for which QA concerns are appropriate. Such activities may include measurement of dissolved oxygen, ferrous iron, oxidation-reduction potential, temperature, specific conductivity, pH, and turbidity. The primary QA objective of these activities is to obtain reproducible measurements to a degree of accuracy consistent with the intended use of the measurements and to document measurement procedures.

3.2 LABORATORY ANALYSES

To obtain data of a quality sufficient to meet the applicable project DQOs, the Work Plan will utilize analytical methods of the QAPP. The laboratory analytical methods that are listed in Table 1.

The Work Plan references the requirements of the analytical methods provided in this QAPP and will meet the general analytical DQOs of site investigations that include comparisons of environmental data to New York State screening values (NYSDEC 1998, 1999, 2006). USEPA SW-846 methods cited in this QAPP provide data of sufficient quality for comparisons to these screening values.

4. PROJECT ORGANIZATION AND RESPONSIBILITY

O'Brien & Gere will be responsible for project management and sample collection. The analytical laboratory will be determined at a later date. Responsibilities for key project team members are summarized below.

4.1 REGULATORY AGENCY

Mr. Peter Ouderkirk, P.E. (NYSDEC Region 6) will serve as the NYSDEC Project Manager and has oversight authority.

4.2 SMC BROWNFIELD SITE REPRESENTATIVE

Mr. Keith Dabbs (Special Metal Corporation) will serve as the SMC Brownfield Site representative and will be responsible for the execution of each phase of the project, including corresponding and coordinating activities with NYDEC.

4.3 O'BRIEN & GERE KEY PERSONNEL

4.3.1 Project Officer

Mr. Douglas M. Crawford, P.E. will serve as the O'Brien & Gere Project Officer and has overall responsibility for meeting the stated project objectives. In addition, he is responsible for providing the O'Brien & Gere Project Manager with access to O'Brien & Gere corporate resources.

4.3.2 Project Manager

Mr. David J. Carnevale, C.P.G. will serve as the O'Brien & Gere Project Manager and will be responsible for implementing the project and has the authority to commit the resources necessary to meet project objectives and requirements. His primary function is to meet the technical, financial, and scheduling objectives and milestones. He will provide direction to O'Brien & Gere Project Team.

4.3.3 Quality Assurance Officer

Ms. Karen Storne will serve as the O'Brien & Gere Quality Assurance Officer (QAO) for this project. She will manage and be responsible for QA/QC review of data generated during the RI. Data processing and validation will be overseen and reviewed by the O'Brien & Gere QAO. If QA problems or deficiencies requiring special action are identified, the O'Brien & Gere QAO, Project Manager, and Project Officer will determine the appropriate corrective action. The QA Officer will then be responsible for follow-up and oversight of corrective action implementation, to the satisfaction of the client and the NYSDEC representative.

The QAO may perform data validation activities or may designate additional data validators to work under her direction. Data validators will be responsible for review of laboratory data for compliance with the project-specific DQOs and for such parameters as precision; accuracy; representativeness; comparability; and completeness. Data validators will notify the QAO of any noted QA deficiencies.

4.3.4 RI Field Manager

The O'Brien & Gere Field Manager will support the O'Brien & Gere Project Manager. The Field Manager will be responsible for directing and coordinating the day-to-day activities of the various resource specialists under his supervision and will report directly to the Project Manager on a daily basis while field activities are underway. The Field Manager or his designee will be present during sampling activities and will keep a general log describing activities conducted on-Site, which will include the identification of personnel entering the Site and the recording of general observations regarding Site activities.

4.3.5 Field Sampling Personnel

O'Brien & Gere field sampling personnel will be responsible for collection, packaging, preservation, and shipping of environmental samples in accordance with the FAP, QAPP, Health and Safety Plan (HASP) and applicable NYSDEC requirements.

4.3.6 Site Health and Safety Officer

The O'Brien & Gere Site Health and Safety Officer (SHSO) will be responsible for adherence of the field crew to health and safety requirements as described in the HASP. Specific responsibilities of the SHSO are outlined in the HASP.

4.4 LABORATORY MANAGEMENT

The laboratories will be determined at a future date. The laboratory shipping addresses and National Environmental Laboratory Accreditation Conference (NELAC) Certification numbers will be provided.

4.4.1 Laboratory Project Manager

The Laboratory Project Manager will be responsible for:

- Coordinating laboratory analysis
- Supervising in-house chain-of-custody
- Scheduling sample analysis
- Overseeing data review
- Overseeing preparation of analytical reports.

It will also be the responsibility of the Laboratory Project Manager to approve final analytical reports prior to submission to O'Brien & Gere.

4.4.2 Laboratory Quality Assurance Manager

The Laboratory Quality Assurance (QA) Manager will be responsible for overview of the laboratory QA, overview of the QA/QC documentation, and conducting detailed data review. The Laboratory QA Manager will decide if laboratory corrective actions are required in addition to seeing that laboratory Standard Operation Procedures (SOPs) are followed.

4.4.3 Laboratory Sample Management Supervisors

The Laboratory Sample Management Supervisors will be responsible for the following tasks:

- Receive and inspect incoming sample containers
- Record condition of incoming sample containers
- Sign appropriate documents
- Verify chain-of-custody and its correctness
- Notify Laboratory Project Manager of sample receipt and inspection
- Assign unique identification number and customer number, and enter each into sample receiving log
- Initiate transfer of samples to appropriate lab sections
- Control and monitor access/storage of samples and extracts.

Primary responsibility for project quality rests with the O'Brien & Gere Project Manager. Independent QA will be provided by the Laboratory QA Managers prior to release of data to O'Brien & Gere.

5. SAMPLE HANDLING AND CUSTODY

5.1 SAMPLE CUSTODY AND PROCEDURES

Chain-of-custody procedures will be instituted and followed throughout the investigation. These procedures include field custody, laboratory custody, and evidence files. Samples are physical evidence and will be handled according to strict chain-of-custody protocols. The O'Brien & Gere QAO must be prepared to produce documentation that traces the samples from the field to the laboratory and through analysis. USEPA has defined custody of evidence as follows:

- In actual possession
- In view after being in physical possession
- In a locked laboratory
- In a secure, restricted area.

5.2 SAMPLE PREPARATION

QA measures for this project will begin with the sample containers; pre-cleaned containers will be purchased from a USEPA-certified manufacturer (I-Chem 200 or equivalent).

Immediately after collection, samples will be transferred to properly labeled sample containers, and properly preserved. Table 1 lists the proper sample container, sample volumes, preservation, and holding times. Samples requiring refrigeration for preservation will be promptly transferred to coolers packed with wet ice and/or ice packs. If field storage is required, the samples will be stored in a secured storage facility and a cooler temperature of 4 °C will be maintained.

5.3 FIELD CUSTODY PROCEDURES

The field sampler is personally responsible for the care and custody of the sample until transferred.

The field logbook will be used to note information regarding collection of samples and any observations. All entries will be signed and dated. Field logbooks will be waterproof and bound. The logbook will be dedicated to the project and pages will not be removed. Corrections will be made by drawing a single line through the incorrect data and initialing and dating the correction that was made to the side of the error. An initialed diagonal line will be used to indicate the end of an entry or the end of the day's activities.

The following information will be recorded in the field logbook by the field sampling team:

- Name and title of author, date, and time of site entry, and physical/environmental conditions during the field activity;
- Meteorological data;
- Project number, client name, and Site name;
- Name and title of field crew members;
- Sample media;
- Sample collection method, including equipment utilized;
- Number and volume of samples collected;
- Description of sample locations;
- Date and time of sample collection;
- Diagrams of sampling process;
- Sample and QA/QC identification numbers;
- Sample distribution;
- Field observations;
- Field measurements made and equipment used;
- Calculations, results, and calibration data for field sampling and measurements;
- References for maps and photographs of the sample location;
- Bottle lot numbers; and
- Dates and method of sample shipments.

A completed sample identification label or tag that will be sequentially numbered, will be attached to each investigative or QC sample and the sample placed in a shipping container. The identification on the label/tag must be sufficient to enable cross-reference with the logbook. The sample label/tag will be recorded using waterproof, non-erasable ink and will be attached to the sample container using adhesive.

The sample labels/tags will contain the following information:

- Sample number identification;
- Project number;
- Date and time of sample collection;
- Designation of the sample as a grab or composite;
- Type of sample matrix;
- Sample location;
- Signature of the sampler;
- Whether the sample is preserved or unpreserved;
- Space for laboratory sample number (only on the sample tag); and
- General types of analysis to be performed.

5.4 CHAIN OF CUSTODY PROCEDURES

Chain-of-custody records will be kept starting at the time that sample containers are placed in the coolers for transportation to the laboratory. One completed chain-of-custody record must be kept with each sample cooler at all times.

The following measures will be taken when completing a chain-of-custody record:

- Chain-of-custody forms will be completed in waterproof, non-erasable ink.
- Chain-of-custody forms will be completed neatly using printed text. If a simple mistake is made, the error will be lined out with a single line and initialed and dated.
- Each separate sample entry will be sequentially numbered.
- The use of "Ditto" or quotation marks to indicate repetitive information in columnar entries should be avoided. If numerous repetitive entries must be made in the same column, a continuous vertical arrow will be used between the first entry and the next different entry.
- When more than one chain-of-custody form is used for a single shipment, each form will be consecutively numbered using the "Page ___ of ___" format.
- If necessary, additional instructions will be placed directly onto the chain-of-custody form.
- Acronyms used on a chain-of-custody form will be defined.

The chain-of-custody form will contain the following information:

- Project identification and number;
- Sample description/location;
- Required analysis;
- Date and time of sample collection;
- Type and matrix of sample;
- Number of sample containers;
- Analysis requested/comments;
- Sampler signature/date/time;
- Date and signature of the field representative;
- Date and signature of the laboratory representative;
- Carrier used to ship coolers; and
- Air bill number (if shipped by a commercial carrier).

In the case that high concentrations are suspected to be present in the samples, a note to that effect will be included on the chain-of-custody form.

Environmental samples will be packed prior to shipment using the following procedures:

- Select a sturdy cooler in good repair and clean. Secure and tape the drain plug with fiber or duct tape.
- Be sure the lids on all bottles are tight (will not leak) and baggies are sealed.
- Where applicable, put ice that has been placed in heavy-duty polyethylene bags and properly sealed on top of or between the samples. Pack samples securely to eliminate breakage during shipment with ice packs to maintain the inside temperature at approximately 4°C.
- Sampling containers will be packed with packing materials. When possible, sample container preparation and packing for shipment will be completed in a well-organized and clean area. Sample containers will be prepared for shipment by wiping containers clean of debris/water using paper towels. Paper towels will be disposed with the personal protective equipment (PPE).
- Place chain-of-custody record into a Ziploc plastic bag, tape the bag to the inner side of the cooler lid, and close the cooler and securely tape (preferably with fiber tape) the top of the cooler shut. Two custody seals will be affixed to the latch and lid of the cooler. The number of the security seal will be recorded on the chain-of-custody form. The custody seals will consist of adhesive-backed tape that easily rips if it is disturbed. The field sampler will initial and date the seal. The seals must be broken to open the cooler and will indicate tampering if the seal is broken before receipt at the laboratory.
- A label containing the name and address of the shipper will be placed on the outside of the container.

The field sampling team will transport or ship the cooler via an overnight delivery service or hand deliver to the laboratory. Prior to shipment of sample coolers, the field sampling team will contact the laboratory to notify the laboratory of the shipment.

Samples will remain in the custody of the sampler until transfer of custody is completed. Transfer consists of:

- Delivery of samples to the Laboratory Sample Custodian; and/or
- Signature of the Laboratory Sample Custodian on the chain-of-custody form as receiving the samples and signature of sampler as relinquishing the samples.

The field sampling team will ship by commercial carrier the coolers containing environmental samples to the laboratories identified for this project. Samples will not be shipped to another laboratory without the permission of the O'Brien & Gere Project Manager.

The chain-of-custody document will be completed by the field sampler and provided for each sample cooler. When transferring the possession of samples, individuals relinquishing and receiving will sign, date, and note the time on the chain-of-custody. Custody of samples must be continuous between parties and time gaps must not be present. Each shipment of samples to the laboratory must have its own chain-of-custody record with the contents of the shipment, method of shipment, name of courier, and other pertinent information written on the record. The original record accompanies the shipment and the copies are kept with the field logbook and distributed to the O'Brien & Gere Project Manager. A copy of the chain-of-custody will be faxed to the laboratory and to the Project Manager on the same day of sample shipment. Freight bills, postal service receipts, and bills of lading will be retained as permanent documentation.

If a carrier is used to take samples between the sampler and the laboratory, the air bill number must be written on the chain-of-custody.

Samples will be shipped or transported within 24 hours of being collected and will arrive at the laboratory no later than 48 hours after sample collection.

5.5 LABORATORY CHAIN OF CUSTODY PROCEDURES

Laboratory custody procedures continue when the samples are received by the laboratory. When the samples arrive at the laboratory, the Laboratory Sample Custodian will sign the courier's air bill or bill of lading (unless hand-delivered) and will note the cooler temperature on the chain-of-custody form. If the cooler temperature is greater than 6 °C, the O'Brien & Gere Project Manager will be notified. If the samples were shipped, the courier's air bill number will be attached to the chain-of-custody and the air bill number will be written on the chain-of-custody form. If the cooler arrives at the laboratory after hours, an external chain-of-custody will be properly filled out and will accompany the cooler until the laboratory receives the cooler.

The Laboratory Sample Custodian's duties and responsibilities upon sample receipt will be to:

- Document receipt of samples by signing the record with the date and time of sample receipt.
- Note the cooler temperature on the chain-of-custody form.
- Inspect sample shipping containers for the presence or absence of custody seals (only if shipped via overnight courier) and for container integrity.
- Sign the appropriate forms or documents, verify, and record the agreement or disagreement of information on sample documents and, if there are discrepancies, record the problem and notify the O'Brien & Gere Project Manager.
- Assign a number for each sample upon receipt. That sample number will be placed on the sample label which will remain attached to the sample container.
- Log sample information into the laboratory sample tracking system.
- Label sample with a unique, sequential laboratory sample number.
- Place samples in the walk-in cooler or sample storage area that is a secure, limited-access storage.

If QC samples have not been properly identified during sample collection, the Laboratory Project Manager will contact the O'Brien & Gere Project Manager to assign QC samples prior to the start of sample analysis.

The laboratory will immediately contact the O'Brien & Gere Project Manager if issues pertaining to sample condition or documentation are detected (e.g., broken security seal; broken, open, or otherwise compromised sample containers; chain-of-custody information in disagreement with sample labels). The laboratory will also contact the O'Brien & Gere Project Manager if sample canister pressure issues are detected upon receipt and documentation of the canister pressures.

At the laboratory, the analysts will be required to log samples and extracts in and out of storage as the analysis proceeds.

There must not be a lapse in the custody for the sample containers and canisters and exchanges of custody must be documented on the form. Samples will be returned to secure storage at the close of business. Care must be exercised to properly complete, date, and sign records needed to generate the data package.

Procedures to be followed by the laboratory include:

- Samples will be handled by the minimum number of people possible.
- The laboratory will set aside a secured sample storage area consisting of a clean, dry, refrigerated, isolated room.
- A specific person will be designated sample custodian. Incoming samples will be received by the custodian who will indicate receipt by signing the chain-of-custody form.
- The custodian will ensure that samples which are heat-sensitive, light-sensitive, radioactive, or which require special handling in other ways, are properly stored and maintained prior to analysis.
- The analytical area will be restricted to authorized personnel only.
- After sample analyses are complete, the analytical data will be kept secured and released to authorized personnel only.

5.6 FINAL EVIDENCE FILES

The final evidence file will be the central repository for documents that constitute evidence relevant to sampling and analysis activities as described in this QAPP. O'Brien & Gere is the custodian of the evidence file and maintains the contents of evidence files for the Site, including relevant records, reported, logs, field notebooks, pictures, subcontractor reports, and data reviews.

Copies of the laboratory data packages will be stored by the laboratory for incorporation into the sample file. The Laboratory Project Manager will be responsible for laboratory data packages.

Upon completion of the analyses, the Laboratory Project Manager will begin assimilating the field and laboratory data. In this way, the file for the samples will be generated. The final file for the sample will be stored at O'Brien & Gere and will consist of the following:

- Laboratory data packages, including summary and raw data from the analysis of environmental and QC samples, chromatograms, mass spectra, calibration data, work sheets, and sample preparation log
- Chain-of-custody records
- Data validation reports
- Field notebooks and data
- Field collection report
- Pictures and drawings
- Progress and QA reports
- Contractor and subcontractor reports
- Correspondence.

The evidence file must be maintained in a secured, limited access area until submittals for the project have been reviewed and approved, and for a minimum of ten years past the submittal date of the final report.

6. LABORATORY QA/QC PROCEDURES

A brief description of laboratory quality assurance/ quality control (QA/QC) analyses is presented in the following sections.

6.1 GC/MS TUNING

Tuning and performance criteria are established to verify mass resolution, identification, and to some degree, instrument sensitivity. These criteria are not sample specific; conformance is determined using standard materials. Therefore, these criteria should be met in all circumstances.

6.2 CALIBRATION

Compliance requirements for satisfactory instrument calibration are established to verify that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of analysis, and continuing calibration and performance checks document satisfactory maintenance and adjustment of the instrument on a day-to-day basis.

6.3 BLANKS

Corrective action procedures are implemented for blank analyses if target compounds are detected at concentrations greater than the requirements presented in corrective action Tables 3-1 through 3-5. The criteria for evaluation of blanks apply to any blank associated with a group of samples. If problems with a blank exist, data associated with the project must be carefully evaluated to determine whether or not there is an inherent variability in the data for the project, or if the problem is an isolated occurrence not affecting other data.

6.4 INTERNAL STANDARDS PERFORMANCE

Internal standards, which are compounds not found in environmental samples, will be spiked into samples, blanks, method spikes and method spike duplicates (MS/MSDs), and laboratory control samples (LCSs) at the time of sample preparation for applicable methods. Internal standards will meet the criteria specified in the corrective action tables.

6.5 SURROGATE EVALUATION

Accuracy and matrix biases for individual samples are monitored for organic analyses using surrogate additions for applicable methods. Surrogates are compounds similar in nature to the target analytes; the surrogates are spiked into environmental samples, blanks, and quality control samples prior to sample preparation for organic analyses. The evaluation of the results of these surrogate spikes is not necessarily straightforward. The sample itself may produce effects due to such factors as interferences and high concentrations of analytes. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the review and validation of data based on specific sample results is frequently subjective.

6.6 LABORATORY CONTROL SAMPLES

Laboratory control samples (LCSs) are standard solutions that consist of known concentrations of the complete list of target analytes spiked into laboratory analyte-free matrix. They are prepared or purchased from a certified manufacturer from a source independent from the calibration standards to provide an independent verification of the calibration procedure. These QC samples are then prepared and analyzed following the same procedures employed for environmental sample analysis to assess method accuracy independently of sample matrix effects. The laboratory prepares and analyzes a LCS with each group of twenty samples of similar matrix that are extracted, digested, or analyzed at the same time. Percentage recoveries are evaluated to assess the efficiency of the preparation and analysis method independent of environmental sample matrix effects.

6.7 MS/MSD AND LABORATORY DUPLICATE SAMPLES

MS/MSD and laboratory duplicate analyses are performed on environmental samples at a frequency of one per every twenty samples of similar matrix. MS/MSD samples are spiked at the laboratory with the complete list of target analytes. MS/MSD and laboratory duplicate data are generated to evaluate precision and accuracy of the analytical method with respect to sample matrices.

6.8 ANALYTE INDENTIFICATION AND QUANTITATION

The objective of the qualitative criteria is to minimize the number of erroneous identifications of compounds. An erroneous identification can either be a false positive (reporting a compound present when it is not) or a false negative (not reporting a compound that is present). The identification criteria can be applied much more easily in detecting false positives than false negatives. Negatives, or non-detected compounds, on the other hand represent an absence of data and are, therefore, much more difficult to assess. The objective for quantitative requirements is to maximize the accuracy of data and sensitivity of the instrument. Unless sample screening indicates the presence of high concentration target analytes, samples are analyzed undiluted to maximize sensitivity. Samples are reanalyzed at the appropriate dilution when concentrations exceed the linear calibration range to maximize accuracy.

Interferences are identified and documented. Samples are diluted only if analytes of concern generate responses in excess of the linear range of the instrument.

6.9 CORRECTIVE ACTION

Generally, the following corrective actions are taken by the laboratory. When calibration, instrument performance, and blank criteria are not met, the cause of the problem is located and corrected. The analytical system is then recalibrated. Sample analysis does not begin until calibration, instrument performance, and blank criteria are met. When matrix spike, reference standard, or duplicate analyses are out of control, the analyses of these samples are investigated. Depending on the results of the overall QC program for the sample set, the data may be accepted, accepted with qualification, or determined to be unusable.

6.10 PREVENTATIVE MAINTENANCE

Preventative maintenance procedures are carried out on laboratory equipment in accordance with the laboratory procedures. Maintenance activities involving are recorded in laboratory documents.

7. FIELD QA/QC PROCEDURES

A brief description of field QA/QC samples is presented in the following sections.

7.1 FIELD DUPLICATE SAMPLES

Collection of field duplicate samples provides for the evaluation of the laboratory's precision performance by comparing analytical results of two samples from the same location. They are also collected to evaluate field sample collection precision procedures. Samples are collected from one location and sent to the laboratory blind (with two different sample identifications). Duplicates of aqueous samples are obtained by alternately filling samples containers from the same sampling device for each parameter. Duplicates of aqueous samples submitted for VOC analysis from monitoring wells are filled from the same bailer full of water whenever possible and are the first set of containers filled. Duplicates of solid samples submitted for VOC analysis are obtained from discrete locations without mixing. Duplicates for the remaining analyses require homogenization by filling a decontaminated stainless steel tray or bowl with the sample and mixing it with a decontaminated stainless steel instrument. The mixed sample is divided in half and scooped alternatively from each half to fill the sample container. One field duplicate sample will be collected for every 20 environmental samples (minimum frequency of 5%) or one per matrix for less than 20 samples. If less than 20 samples are collected, one field duplicate sample will be collected.

7.2 MS/MSD AND DUPLICATE SAMPLES

MS/MSD samples are duplicate samples that have spiking solutions added at the laboratory during sample preparation. MS/MSD samples are considered identical to the original sample. The percent recovery of the spiked amount indicates the accuracy of the extraction as well as interferences caused by the matrix. Relative percent differences (RPD) between spike sample recoveries will indicate the precision of the data. Duplicates of aqueous samples are obtained by alternately filling samples containers from the same sampling device for each parameter. One MS/MSD sample set will be collected for every 20 environmental samples submitted to the laboratory (minimum frequency of 5%) or one MS/MSD for less than 20 samples.

For inorganic analyses, duplicate analyses will be performed on environmental samples at a frequency of one per sample matrix and every 20 samples of similar matrix. Duplicate samples will be prepared and analyzed within the same batch as the environmental samples. Duplicate data are generated to determine precision of the analytical method with respect to sample matrices.

7.3 FIELD BLANKS

Field blanks will consist of samples of analyte-free water that are passed through and/or over decontaminated sampling equipment. One field blank will be collected per set of sampling equipment per sampling event. Field blanks will not be required if dedicated sampling equipment is utilized. The field blank samples will be subject to the same analyses as the environmental samples. One field blank will be collected per 10 samples or once per day, whichever is more conservative.

7.4 TRIP BLANKS

Trip blanks will not be required for the RI as volatile organic samples are not scheduled for collection.

7.5 TEMPERATURE BLANKS

Temperature blanks will consist of vials of water that have undergone shipment from the sampling site to the laboratory in coolers with the environmental samples to be analyzed for the sampling program. The temperature of these blanks will be measured at the laboratory upon receipt of the sample cooler to verify compliance with the cooler temperature requirement.

8. DATA VALIDATION AND USABILITY

8.1 SCOPE OF VALIDATION

Data validation will be performed on the data collected during the RI utilizing the NYSDEC DUSR guidance (NYSDEC, 2002). O'Brien & Gere data validators will provide data validation services.

Upon request by the data validator, the laboratory will provide additional or supplemental information within three working days of the request.

8.2 VALIDATION PROCEDURES

Data Validation is a process of determining the suitability of a measurement system for providing useful analytical data. Data validation is essentially a three-step process in which the analytical data's quality assurance/quality control information is first compared to a series of QA/QC criteria. Based on the results of this comparison, the analytical data are then assigned qualifiers, which provide an indication of the data's usability. Finally, an overall evaluation of the data's usability is performed.

Full validation will be performed for the samples collected for each type of analysis for the SI. Full data validation will consist of a review of data summary forms and supportive raw analytical data that are provided in the data packages.

Evaluation of laboratory data will be performed utilizing the QA/QC criteria established in this QCD, as listed in Tables 3-1 though 3-5, the analytical methods, and laboratory established control limits.

In accordance with the DUSR process, the following questions will be answered during the validation:

1. Is the data package complete as defined under the project requirements for the NYSDEC ASP Category B?
2. Have the holding times been met?
3. Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, duplicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?
4. Have the data been generated using established and project-specific protocols?
5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?
6. Have the correct data qualifiers been applied?

Data affected by excursions from the previously described QA/QC criteria will be qualified using the following USEPA Region II data validation guidance documents or the most current documents and professional judgment:

- United States Environmental Protection Agency (USEPA). 2006a. *USEPA Region II Evaluation of Metals Data for the CLP Program, SOP HW-2* Revision 13. New York, NY.
- USEPA. 2006b. *USEPA Region II Validating Volatile Organic Compounds by SW-846 Method 8260B, SOP HW-24* Revision 2. New York, NY.
- USEPA. 2006c. *Validating Volatile Organic Analysis of Ambient Air in canister by Method TO-15. SOP HW-31, Revision 4.* Albany, New York

These validation guidelines will be modified to reflect the QA/QC criteria established in this QCD and the analytical methods.

Data validators will be responsible for reviewing the QC parameters as listed below. Data validators will recalculate approximately ten percent of the laboratory sample calculations using raw data when verifying sample results for full validation. In addition, data validators will review approximately ten percent of the raw data to verify that compound identification was performed correctly and transcription errors are not present for full validation.

Data quality will be evaluated using current laboratory control limits as provided in the data packages. Sample data will be qualified based on excursions from control limits. Data validators will check corrective action reports and results of reanalysis if available. Corrective actions implemented by the laboratory will be referenced in the data validation report.

Data will be qualified using the following validation approach:

- If percent recoveries are less than laboratory control limits but greater than ten percent (greater than thirty percent for aqueous metals and inorganic parameters), non-detected and detected results are qualified as approximate (UJ, J) to indicate minor excursions.
- If percent recoveries are greater than laboratory control limits, detected results are qualified as approximate (J) to indicate minor excursions.
- If percent recoveries are less than ten percent (less than thirty percent for aqueous metals and inorganic parameters), detected results are qualified as approximate (J) and non-detected results are qualified as rejected (R) to indicate major excursions.
- If relative percent differences (RPDs) for matrix spikes (MSs) and matrix spike duplicates (MSDs) are outside of laboratory control limits, detected results are qualified as approximate (J).
- If RPDs for field duplicates are outside of validation criteria, detected and non-detected results are qualified as approximate (UJ, J).
- The following actions are taken for blank evaluation:
    1. If methylene chloride, acetone or 2-butanone is detected in the sample at a concentration that is less than ten times the concentration in the associated blank, the sample result is identified as non-detected and qualified as “U”.
    2. If other target analytes are detected in the sample at a concentration that is less than five times the concentration detected in the associated blank, the sample result is identified as non-detected and qualified as “U”.
    3. For blank impacted sample concentrations that are less than the QL, the QL is reported and the “U” qualifier is added.
    4. For blank impacted sample concentrations that are greater than the QL, the “U” qualifier is added to the existing sample concentration.
    5. The highest concentrations of the target analytes are used to evaluate the associated samples.

- Qualification of organic data for MS/MSD analyses excursions will be performed only when both MS and MSD percent recoveries are outside of laboratory control limits.
- Organic data will be rejected in the case that both MS/MSD recoveries are less than ten percent.
- Qualification of data will not be performed if MS/MSD or surrogate recoveries are outside of laboratory control limits due to sample dilution.
- In the case that excursions were detected in more than one quality control sample of the same matrix within one sample delivery group, samples will be batched according to collection date and qualified accordingly.
- For organic analyses, qualification of data associated with MS/MSD or field duplicate excursions will be limited to the un-spiked sample or the field duplicate pair, respectively.
- Field duplicate data will be evaluated against relative RPD criteria of less than 100 percent for solid samples, 50 percent for aqueous samples, and 25 percent for air samples when results are greater than five times the QL. When sample results for field duplicate pairs are less than five times the QL, the data will be evaluated using control limits of plus or minus two times the QL.
- Inorganic laboratory duplicate data will be evaluated against laboratory control limits established for RPD criteria when results are greater than five times the QL. When sample results for laboratory duplicate pairs are less than five times the QL, the data will be evaluated using control limits of plus or minus two times the QL.
- Results for samples submitted for organic analyses impacted by cooler temperatures of greater than 10°C, will be qualified as approximate. Inorganic results will not be qualified for elevated cooler temperatures.
- Results for samples submitted for organic and inorganic analyses that are impacted by percent solids of 50 percent or less will be qualified as approximate.

In accordance with the USEPA guidance, and utilizing professional judgment, the following qualifiers will be used in the data validation:

"R" Indicates that the reporting limit or sample result is determined to be unusable due to a major deficiency in the data generation process. The data should not be used for any qualitative or quantitative purposes.

"U" Indicates that the analyte was analyzed for, but a concentration was not detected. The sample quantitation limit is presented. This qualifier is also used in the validation process to signify that the detection limit of an analyte was raised due to blank contamination.

"J" Indicates that the concentration should be considered approximate. This qualifier is used when the data validation process identifies a deficiency in the data generation process. This qualifier is also applied by the laboratory for organic analyses when the analyte concentration was greater than the MDL but less than the QL. In the latter case, the identification of the analyte is not in question but the quantitation of the analyte concentration may be uncertain.

"UJ" Indicates that the analyte was analyzed for, but a concentration was not detected. The sample quantitation limit is presented, and should be considered approximate. This qualifier is used when the data validation process identifies a deficiency in the data generation process.

“JN “ Indicates that there is presumptive evidence that the analyte is present, but it has not been confirmed due to column confirmation excursions.

The following guidelines will be used regarding the assignment of qualifiers and the evaluation of data:

- The data quality evaluation results in only one type of qualifier (“U”, “J”, “UJ,” or “R”) for each analyte; in a case when several qualifiers are applicable to the same analyte, the cumulative effect of the various QA/QC excursions is employed in assigning the final data qualifiers. For example, if a sample result is affected by low surrogate recoveries for which the "UJ" qualifier is applied, but low MS/MSD recoveries result in the rejection of the sample result (application of the "R" qualifier), the final data qualifier is the "R" qualifier.

The following parameters will be included in the review for organic and inorganic analyses for full validation (where applicable):

1. Chain-of-custody
2. Sample collection and sample preservation
3. Holding times
4. GC/MS tuning criteria
5. Initial calibration and calibration verification
6. Blank analysis
7. Surrogate recovery
8. Matrix spike/matrix spike duplicate (MS/MSD) analysis
9. Laboratory duplicate analysis
10. Field duplicate analysis
11. LCS analysis
12. ICP interference check sample analysis
13. ICP serial dilution analysis
14. Internal standards performance
15. Target analyte identification, quantitation, and QLs
16. Documentation completeness
17. QCD compliance

Tentatively identified compounds (TICs) for organic analyses will not be evaluated as part of the validation process.

8.3 DATA USABILITY EVALUATION

Based on the QA/QC information review and the qualifiers assigned to the analytical data, an overall evaluation of the data's usability will be performed. Data usability is defined as the percentage of data that remains unqualified or is qualified as approximate or non-detected due to blank contamination, divided by the data reported by the laboratory times 100. The percentage usability excludes the data qualified as rejected due to major QA/QC excursions. The non-usable data are defined as the percentage of the data qualified as rejected divided by the data reported by the laboratory times 100. The data usability will be provided for each the complete data set for this project.

The data usability evaluation considers the data parameters of precision, sensitivity, accuracy, representativeness, comparability, and completeness, which are described as follows:

- Precision is evaluated through the review of field duplicate samples, laboratory duplicates, and MS/MSD samples.
- Sensitivity is evaluated through the review of QLs.
- Accuracy is evaluated through the review of MS/MSD samples, internal standards, surrogate recoveries, LCS recoveries, calibration, instruction performance check, ICP interference check analysis, and ICP serial dilutions.
- Representativeness is evaluated through the review of holding times, sample preservation and preparation, blank analysis and target compound identification and quantification.
- Comparability is evaluated through the review of the analytical methods and reporting procedures for consistency.
- Completeness is defined as the overall percentage of sample results that are determined to be usable.

8.4 DATA USABILITY SUMMARY REPORT

The DUSR will contain separate QA sections in which data quality information collected during the investigation is summarized. The DUSR will include the following:

- Guidelines used to evaluate the data.
- Data qualifiers applied to sample results.
- Summary of samples collected and analyses performed.
- Narrative that identifies major and minor analysis excursions detected for each parameter evaluated for each analysis.
- Additional issues and information that may be beneficial to the data user are discussed.
- Data summary forms.
- Data usability.

The DUSR will be prepared under the direction of the O'Brien & Gere QA Officer.

REFERENCES

American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1998. *Standard Methods for the Examination of Water and Wastewater*, 20th Edition. Washington, D.C.

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USEPA. 2006c. *Validating Volatile Organic Analysis of Ambient Air in canister by Method TO-15. SOP HW-31, Revision 4.* Albany, New York

Table 1. *Field Sampling Summary*

Parameter (Method)	Matrix	Sample Containers and Volumes	Preservation	Holding Times	Number of Investigative Samples	QC sample frequency			
						Field Duplicate	Trip Blank	MS/MSD and Spike Duplicate**	Field Blank***
VOCs (USEPA Methods 5030B/5035A/8000C/8260B)[1]	Groundwater	3 40-milliliter glass vials with Teflon® lined septum caps	4°C HCL to pH≤2 FC Sealed and Headspace Free	Analysis within 14 days from collection for preserved samples. Analysis within 7 days from collection for samples not acid preserved.	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	1 each in cooler with VOC samples	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required
VOCs Low Level* (USEPA Methods 5035A/8000C/8260B)[1]	Surface Soil Subsurface Soil Sediment	Encore sampler used to collect and transport sample in accordance with USEPA Method 5035A. #Alternatively, add 5 grams (weighted in the field) of sample from Encore sampler to pre-weighed vial containing stir bar and sodium bisulfate acidic preservative solution in accordance with USEPA Method 5035A. **Method 5030A: Bulk sampling technique: 125 mm wide mouth glass container sealed with Teflon® lined lid	4°C Sealed and Headspace Free	At the laboratory: For Encore sampler: extrude sample to a sealed vial and freeze to -7°C within 48 hours from collection. Analysis must be performed within 14 days from collection. Otherwise, 48 hours from collection to analysis. For sodium bisulfate preserved vials: Analysis must be performed within 14 days from collection. For bulk sampling technique: Analysis must be performed within 14 days from collection.	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	1 each in cooler with VOC samples	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required

Table 1. *Field Sampling Summary*

Parameter (Method)	Matrix	Sample Containers and Volumes	Preservation	Holding Times	Number of Investigative Samples	QC sample frequency			
						Field Duplicate	Trip Blank	MS/MSD and Spike Duplicate**	Field Blank***
VOCs Medium Level* (USEPA Methods 5035A/8000C/8260B)[1]	Surface Soil Subsurface Soil Sediment	Encore sampler in accordance with USEPA Method 5035A. Alternatively, 1-40 milliliter glass vials with Teflon® lined septum caps, for air-tight and headspace free seal in accordance with USEPA Method 5035A. 5 grams sample volume required.	4°C Sealed and Headspace Free	At the laboratory within 48 hours of collection: Add methanol solution to 5 grams of sample in accordance with USEPA Method 5035A. 14 days from collection for analysis	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	One ea. per cooler with VOC samples. Methanol preservation trip blank.	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required
VOCs using TCLP preparation (USEPA Methods 1311/8000C/8260B)[1]	Surface Soil Subsurface Soil Sediment	120 milliliter wide mouth glass container with Teflon® lined lid. 25 grams sample volume required.	4°C	For TCLP preparation, 14 days from collection to TCLP extract generation and 14 days from TCLP extract generation to analysis.	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	1 each in cooler with VOC samples	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required
SVOCs (USEPA Methods 3510C/3520C/8000C/8270C)[1]	Groundwater	1-one liter amber glass container with Teflon® lined screw caps	4°C	7 days from collection to extraction; 40 days from extraction to analysis	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	NA	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required

Table 1. *Field Sampling Summary*

Parameter (Method)	Matrix	Sample Containers and Volumes	Preservation	Holding Times	Number of Investigative Samples	QC sample frequency			
						Field Duplicate	Trip Blank	MS/MSD and Spike Duplicate**	Field Blank***
SVOCs (USEPA Methods 1311/3541/3550B/8000C/ 8270C)[1]	Surface Soil Subsurface Soil Sediment	250 milliliter wide mouth glass container with Teflon® lined lid. 100 grams sample volume required. For TCLP preparation, 100 grams sample volume required.	4°C	14 days from collection to extraction; 40 days from extraction to analysis For TCLP preparation, 14 days from collection to TCLP extract generation and 7 days from TCLP extract generation to SVOC extraction. 40 days from SVOC extraction to analysis.	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	NA	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required
PCBs (USEPA Method 3510C/3520C/8000C/8082)[1]	Groundwater	1-one liter amber glass container with Teflon® lined screw caps	4°C	7 days from collection to extraction; 40 days from extraction to analysis	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	NA	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required
PCBs (USEPA Method 3541/3550B/8000C/8082)[1]	Surface Soil Subsurface Soil Sediment	250 milliliter wide mouth glass container with Teflon® lined lid. 100 grams sample volume required.	4°C	14 days from collection to extraction; 40 days from extraction to analysis	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	NA	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required
Metals (USEPA Methods 3005A/6010B)[1]	Groundwater	1-250 milliliter polyethylene or fluorocarbon (TFE or PFA) container. 100 milliliters sample volume required.	4°C HNO_3 to pH<2	180 days from collection for analysis	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	NA	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required

Table 1. *Field Sampling Summary*

Parameter (Method)	Matrix	Sample Containers and Volumes	Preservation	Holding Times	Number of Investigative Samples	QC sample frequency			
						Field Duplicate	Trip Blank	MS/MSD and Spike Duplicate**	Field Blank***
Metals (USEPA Methods 13611/3050B/6010B)[1]	Surface Soil Subsurface Soil Sediment	4 ounce wide mouth polyethylene or fluorocarbon (TFE or PFA) container. 50 grams sample volume required. For TCLP preparation, 100 grams sample volume required.	4°C	180 days from collection for analysis For TCLP preparation, 180 days from collection to TCLP extract generation and 180 days from TCLP extraction to analysis	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	NA	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required
Mercury (USEPA Method 7470A)[1]	Groundwater	1-250 milliliter polyethylene or fluorocarbon (TFE or PFA) container. 200 milliliters sample volume required.	4°C HNO_3 to pH<2	28 days from collection for analysis	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	NA	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required
Mercury (USEPA Method 1311/7471A)[1]	Surface Soil Subsurface Soil Sediment	4 ounce wide mouth polyethylene or fluorocarbon (TFE or PFA) container. 50 grams sample volume required. For TCLP preparation, 100 grams sample volume required.	4°C	28 days from collection for analysis For TCLP preparation, 28 days from collection to TCLP extract generation and 28 days from TCLP extraction to analysis.	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	NA	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required
Total Cyanide (USEPA Methods 9010B/9012A)[1]	Groundwater	1-500 milliliter plastic bottle. 100 milliliters sample volume required.	NaOH to pH>12, 4°C OA	14 days from collection for analysis	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	NA	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required

Table 1. *Field Sampling Summary*

Parameter (Method)	Matrix	Sample Containers and Volumes	Preservation	Holding Times	Number of Investigative Samples	QC sample frequency			
						Field Duplicate	Trip Blank	MS/MSD and Spike Duplicate**	Field Blank***
Total Cyanide (USEPA Methods 9010B/9012A)[1]	Surface Soil Subsurface Soil Sediment	4 ounce wide mouth glass container with Teflon® lined lid. 50 grams sample volume required.	4°C	14 days from collection for analysis	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	NA	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required
TOC (USEPA Lloyd Kahn)[2]	Surface Soil Subsurface Soil Sediment	4 ounce wide mouth glass container with Teflon® lined lid. 50 grams sample volume required.	4°C	14 days from collection for analysis	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	NA	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required
Ignitability (USEPA Methods 1010/1020A/1030)[1]	Waste	8 ounce wide mouth glass container with Teflon® lined lid. 50 grams sample volume required.	4°C	As soon as possible	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	NA	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required
Corrosivity (USEPA Methods 9040B/9045B)[1]	Waste	8 ounce wide mouth glass container with Teflon® lined lid. 50 grams sample volume required.	4°C	As soon as possible	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	NA	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required
Reactivity (Reactive Cyanide) (USEPA SW-846 Chapter 7) [1]**	Waste	8 ounce wide mouth glass container with Teflon® lined lid. 50 grams sample volume required.	4°C	As soon as possible	See Work Plan*	One per 20 samples or one per matrix (for less than 20 samples)	NA	One per 20 samples or one per matrix (for less than 20 samples)	One per 20 samples or one per day as required

Table 1. *Field Sampling Summary*

Parameter (Method)	Matrix	Sample Containers and Volumes	Preservation	Holding Times	Number of Investigative Samples	QC sample frequency			
						Field Duplicate	Trip Blank	MS/MSD and Spike Duplicate**	Field Blank***
Percent Solids (ASTM 4643)[3], (SM20 2540B)[4]	Surface Soil Subsurface Soil Sediment	8 ounce wide mouth glass container with Teflon® lined lid. 50 grams sample volume required.	4°C	NA	NA	NA	NA	NA	NA

NOTES:
* Indicates that the Work Plan and FAP are to be consulted for samples that will be collected.
** Although withdrawn by USEPA, USEPA Method 5030A, involving utilizing bulk sample vials for preparation, NYSDEC allows this as an option for solid samples submitted for VOC analysis.
***MS/MSD indicates matrix spike/matrix spike duplicate sample for organic analyses. Spike duplicate may be performed for inorganic analyses.
**** Field blank is required at a frequency of one per 20 samples or one per day if less than 20 samples are collected for each matrix type. Field blank is not required if disposable equipment is used.
# Indicates that soil samples that contain carbonate minerals may effervesce upon contact with the preservative.

FC indicates that if free chlorine is present in samples, it must be removed by the appropriate addition of sodium thiosulfate or ascorbic acid.
OA indicates that if oxidizing agents are present, add ascorbic acid.
VOCs indicates volatile organic compounds.
SVOCs indicates semivolatile organic compounds.
TOC indicates total organic carbon.
TCLP indicates toxicity characteristic leachate procedure
HCL indicates hydrochloric acid.
HN03 indicates nitric acid.
NaOH indicates sodium hydroxide.

1. United States Environmental Protection Agency (USEPA). 2004. *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846,* 3rd Edition, Update IIIB. Washington D.C.
2. United States Environmental Protection Agency (USEPA). 1996*. Determination of Total Organic Carbon in Sediment (Lloyd Kahn Method).* USEPA Region II, Environmental Services Division, Monitoring Management Branch, Edison, New Jersey
3. American Water Works Association, American Public Health Association, and Water Environment Federation. 1998. *Standard Methods for the Examination of Water and Wastewater*, 20th Edition. Washington, D.C
4. American Society for Testing and Materials (ASTM). 1990. West Conshohocken, PA.

Source: O'Brien & Gere

Table 2-1. *Laboratory and project QLs and action limits for VOCs by USEPA Method 8260B in aqueous samples and TCLP leachates*

TCL Target Analyte	*USEPA Method*	*Laboratroy QL (ug/L)*	*QL (TCLP Preparation) (ug/L)*	*Project QL (ug/L)*	*Laboratory MDL (ug/L)*	*Maximum Concentration of Contaminants for the Toxicity Characteristic (ug/L)*	**Groundwater GA Screening Criteria** *(ug/L)*
1,1,1-Trichloroethane	8260B	0.5	10	0.5	TBD	NL	5
1,1,2,2-Tetrachloroethane	8260B	0.5	10	0.5	TBD	NL	5
1,1,2-Trichloro-1,2,2-trifluoroethane	8260B	0.5	10	0.5	TBD	NL	5
1,1,2-Trichloroethane	8260B	0.5	10	0.5	TBD	NL	1.0
1,1-Dichloroethane	8260B	0.5	10	0.5	TBD	NL	5
1,1-Dichloroethene	8260B	0.5	10	0.5	TBD	700	5
1,2,3-Trichlorobenzene	8260B	0.5	10	0.5	TBD	NL	5*
1,2,4-Trichlorobenzene	8260B	1.0	20	1.0	TBD	NL	5*
1,2-Dibromo-3-chloropropane	8260B	5.0	100	5.0	TBD	NL	0.04
1,2-Dibromoethane	8260B	0.5	10	0.5	TBD	NL	NL
1,2-Dichlorobenzene	8260B	0.5	10	0.5	TBD	NL	3.0
1,2-Dichloroethane	8260B	0.5	10	0.5	TBD	500	0.6
1,2-Dichloropropane	8260B	0.5	10	0.5	TBD	NL	1.0
1,3-Dichlorobenzene	8260B	0.5	10	0.5	TBD	NL	3.0
1,4-Dichlorobenzene	8260B	0.5	10	0.5	TBD	7,500	3.0
1,4-Dioxane	8260B	10	200	10	TBD	NL	NL
2-Butanone (Methylethyl ketone)	8260B	10	200	10	TBD	200,000	NL
2-Hexanone	8260B	5.0	100	5.0	TBD	NL	NL
4-Methyl-2-pentanone	8260B	5.0	100	5.0	TBD	NL	NL
Acetone	8260B	10	200	10	TBD	NL	NL
Benzene	8260B	0.5	10	0.5	TBD	500	1.0
Bromochloromethane	8260B	0.5	10	0.5	TBD	NL	5.0
Bromodichloromethane	8260B	0.5	10	0.5	TBD	NL	NL
Bromoform	8260B	0.5	10	0.5	TBD	NL	NL
Bromomethane	8260B	1.0	20	1.0	TBD	NL	5
Carbon disulfide	8260B	0.5	10	0.5	TBD	NL	60
Carbon tetrachloride	8260B	0.5	10	0.5	TBD	500	5.0
Chlorobenzene	8260B	0.5	10	0.5	TBD	100,000	5
Chloroethane	8260B	1.0	20	1.0	TBD	NL	5
Chloroform	8260B	0.5	10	0.5	TBD	6,000	7.0
Chloromethane	8260B	1.0	20	1.0	TBD	NL	5
cis-1,2-Dichloroethene	8260B	0.5	10	0.5	TBD	NL	5
cis-1,3-Dichloropropene	8260B	0.5	10	0.5	TBD	NL	0.4*
Cyclohexane	8260B	0.5	10	0.5	TBD	NL	NL
Dibromochloromethane	8260B	0.5	10	0.5	TBD	NL	NL
Dichlorodifluoromethane	8260B	1.0	20	1.0	TBD	NL	5
Ethylbenzene	8260B	0.5	10	0.5	TBD	NL	5
Isopropylbenzene	8260B	0.5	10	0.5	TBD	NL	5
Methyl acetate	8260B	5.0	100	5.0	TBD	NL	NL
Methyl tert-butyl ether	8260B	1.0	20	1.0	TBD	NL	NL
Methylcyclohexane	8260B	0.5	10	0.5	TBD	NL	NL
Methylene chloride	8260B	2.0	40	2.0	TBD	NL	5
Styrene	8260B	0.5	10	0.5	TBD	NL	5
Tetrachloroethene	8260B	0.5	10	0.5	TBD	700	5
Toluene	8260B	0.5	10	0.5	TBD	NL	5
trans-1,2-Dichloroethene	8260B	0.5	10	0.5	TBD	NL	5
trans-1,3-Dichloropropene	8260B	0.5	10	0.5	TBD	NL	0.4*
Trichloroethene	8260B	0.5	10	0.5	TBD	500	5
Trichlorofluoromethane	8260B	1.0	20	1.0	TBD	NL	5
Vinyl chloride	8260B	1.0	20	1.0	TBD	200	2.0
Xylenes (total	8260B	1.0	20	1.0	TBD	NL	5

Notes:

QLs indicates practical quantitation limits.

MDLs indicate method detection limits.

TCLP indicates toxicity characteristic leachate procedure

Target compound list (TCL) resource - SOMO1.2.

ug/L indicates micrograms per liter.

NL indicates not listed.

TBD indicates to be determined.

*Applies to the sum of the isomers.

MDLs and QLs will be obtained from the laboratory at a future date

TCLP assumes leachate is generated using 25 grams of solid sample; leachate is diluted 1:20 for sample analysis.

Method reference:

1. United States Environmental Protection Agency (USEPA). 2004. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846, 3rd Edition, Update IIIB. Washington D.C.

Action limit references:

1. Maximum Concentration of Contaminants for the Toxicity Characteristic concentrations current as of January 2010.
2. Groundwater GA indicates New York State Class GA Ground Water Standards, current as of January 2010, Table 1 (section 703.5)

Table 2-2. *Laboratory and project QLs and action limits for VOCs by USEPA Method 8260B in soil / sediment samples*

TCL Target Analytes	USEPA Method	Laboratory Low Level QL (ug/kg)	Laboratory Medium Level QL (ug/kg)	Project QL (ug/kg)	Laboratory MDL (ug/kg)	Industrial SCOs (ug/kg)	Human Health Bioaccumulation Sediment Criteria (ug/gOC)	Benthic Aquatic Life Chronic Toxicity Sediment Criteria (ug/gOC)	Wildlife Bioaccumulation Sediment Criteria (ug/gOC)
1,1,1-Trichloroethane	8260B	2.5	250	2.5	TBD	1,000,000	NL	NL	NL
1,1,2,2-Tetrachloroethane	8260B	2.5	250	2.5	TBD	NL	0.3	NL	NL
1,1,2-Trichloro-1,2,2-trifluoroethane	8260B	2.5	250	2.5	TBD	NL	NL	NL	NL
1,1,2-Trichloroethane	8260B	2.5	250	2.5	TBD	NL	0.6	NL	NL
1,1-Dichloroethane	8260B	2.5	250	2.5	TBD	480,000	NL	NL	NL
1,1-Dichloroethene	8260B	2.5	250	2.5	TBD	1,000,000	0.02	NL	NL
1,2,3-Trichlorobenzene	8260B	5	500	5	TBD	NL	NL	91	NL
1,2,4-Trichlorobenzene	8260B	5.0	500	5.0	TBD	NL	NL	91	NL
1,2-Dibromo-3-chloropropane	8260B	5.0	500	5.0	TBD	NL	NL	NL	NL
1,2-Dibromoethane	8260B	2.5	250	2.5	TBD	NL	NL	NL	NL
1,2-Dichlorobenzene	8260B	2.5	250	2.5	TBD	1,000,000	NL	12	NL
1,2-Dichloroethane	8260B	2.5	250	2.5	TBD	60,000	0.7	NL	NL
1,2-Dichloropropane	8260B	2.5	250	2.5	TBD	NL	NL	NL	NL
1,3-Dichlorobenzene	8260B	2.5	250	2.5	TBD	560,000	NL	12	NL
1,4-Dichlorobenzene	8260B	2.5	250	2.5	TBD	250,000	NL	12	NL
1,4-Dioxane	8260B	40	4000	40	TBD	250,000	NL	NL	NL
2-Butanone (Methyethyl ketone)	8260B	40	4000	40	TBD	1,000,000	NL	NL	NL
2-Hexanone	8260B	5.0	500	5.0	TBD	NL	NL	NL	NL
4-Methyl-2-pentanone	8260B	5.0	500	5.0	TBD	NL	NL	NL	NL
Acetone	8260B	40	4000	40	TBD	1,000,000	NL	NL	NL
Benzene	8260B	2.5	250	2.5	TBD	89,000	0.6	28	NL
Bromochloromethane	8260B	205	250	205	TBD	NL	NL	NL	NL
Bromodichloromethane	8260B	2.5	250	2.5	TBD	NL	NL	NL	NL
Bromoform	8260B	2.5	250	2.5	TBD	NL	NL	NL	NL
Bromomethane	8260B	5.0	500	5.0	TBD	NL	NL	NL	NL
Carbon disulfide	8260B	2.5	250	2.5	TBD	NL	NL	NL	NL
Carbon tetrachloride	8260B	2.5	250	2.5	TBD	44,000	0.6	NL	NL
Chlorobenzene	8260B	2.5	250	2.5	TBD	1,000,000	NL	3.5	NL
Chloroethane	8260B	5.0	500	5.0	TBD	NL	NL	NL	NL
Chloroform	8260B	2.5	250	2.5	TBD	700,000	NL	NL	NL
Chloromethane	8260B	5.0	500	5.0	TBD	NL	NL	NL	NL
cis-1,2-Dichloroethene	8260B	2.5	250	2.5	TBD	1,000,000	NL	NL	NL
cis-1,3-Dichloropropene	8260B	2.5	250	2.5	TBD	NL	NL	NL	NL
Cyclohexane	8260B	2.5	250	2.5	TBD	NL	NL	NL	NL
Dibromochloromethane	8260B	2.5	250	2.5	TBD	NL	NL	NL	NL
Dichlorodifluoromethane	8260B	5.0	500	5.0	TBD	NL	NL	NL	NL
Ethylbenzene	8260B	2.5	250	2.5	TBD	780,000	NL	24	NL
Isopropylbenzene	8260B	2.5	250	2.5	TBD	NL	NL	12	NL
Methyl acetate	8260B	20	2000	20	TBD	NL	NL	NL	NL
Methyl tert-butyl ether	8260B	2.5	250	2.5	TBD	1,000,000	NL	NL	NL
Methylcyclohexane	8260B	2.5	250	2.5	TBD	NL	NL	NL	NL
Methylene chloride	8260B	5.0	500	5.0	TBD	1,000,000	NL	NL	NL
Styrene	8260B	2.5	250	2.5	TBD	NL	NL	NL	NL

Table 2-2. *Laboratory and project QLs and action limits for VOCs by USEPA Method 8260B in soil / sediment samples*

TCL Target Analytes	*USEPA Method*	*Laboratory Low Level QL (ug/kg)*	*Laboratory Medium Level QL (ug/kg)*	*Project QL (ug/kg)*	*Laboratory MDL (ug/kg)*	*Industrial SCOs (ug/kg)*	*Human Health Bioaccumulation Sediment Criteria (ug/gOC)*	*Benthic Aquatic Life Chronic Toxicity Sediment Criteria (ug/gOC)*	*Wildlife Bioaccumulation Sediment Criteria (ug/gOC)*
Tetrachloroethene	8260B	2.5	250	2.5	TBD	300,000	0.8	NL	NL
Toluene	8260B	2.5	250	2.5	TBD	1,000,000	NL	49	NL
trans-1,2-Dichloroethene	8260B	2.5	250	2.5	TBD	1,000,000	NL	NL	NL
trans-1,3-Dichloropropene	8260B	2.5	250	2.5	TBD	NL	NL	NL	NL
Trichloroethene	8260B	2.5	250	2.5	TBD	400,000	2	NL	NL
Trichlorofluoromethane	8260B	5.0	500	5.0	TBD	NL	NL	NL	NL
Vinyl chloride	8260B	5.0	500	5.0	TBD	27,000	0.07	NL	NL
Xylenes (total)	8260B	5.0	500	5.0	TBD	1,000,000	NL	92	NL

Notes:

QLs indicates practical quantitation limits.

MDLs indicate method detection limits.

Target compound list (TCL) resource - SOMO1.2.

ug/kg indicates micrograms per killogram.

mg/kg indicates milligrams per killogram.

TBD indicates to be determined.

NL indicates not listed.

MDLs and QLs will be obtained from the laboratory at a future date

Medium level soil assumes 5 grams of sample and 100 microliters of extract analyzed.

Method reference:

1. United States Environmental Protection Agency (USEPA). 2004. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846, 3rd Edition, Update IIIB. Washington D.C.

Action limit reference:

SCOs indicates NYSDEC 6 NYCRR Part 375 soil cleanup objectives, current as of January 2010.

Sediment criteria taken from Technical Guidance for Screening Contaminated Sediments (NYSDEC, January 1999)

Table 2-3. *Laboratory and project QLs and action limits for SVOCs by USEPA Method 8270C in aqueous samples and TCLP leachates*

TCL Target Analytes	USEPA Method	Laboratory QL (ug/L)	Laboratory QL (TCLP Preparation) (ug/L)	Project QL (ug/L)	Laboratory MDL (ug/L)	Maximum Concentration of Contaminants for the Toxicity Characteristic (ug/L)	Groundwater GA Screening Criteria (ug/L)
1,1´-Biphenyl	8270C	10	100	10	TBD	NL	5
1,2,4,5-Tetrachlorobenzene	8270C	50	500	50	TBD	NL	5
2,3,4,6-Tetrachlorophenol	8270C	50	500	50	TBD	NL	1**
2,4,5-Trichlorophenol	8270C	50	500	50	TBD	400,000	1**
2,4,6-Trichlorophenol	8270C	10	100	10	TBD	2000	1**
2,4-Dichlorophenol	8270C	10	100	10	TBD	NL	1**
2,4-Dimethylphenol	8270C	10	100	10	TBD	NL	1**
2,4-Dinitrophenol	8270C	50	500	50	TBD	NL	1**
2,4-Dinitrotoluene	8270C	10	100	10	TBD	130	5
2,6-Dinitrotoluene	8270C	10	100	10	TBD	NL	5
2-Chloronaphthalene	8270C	10	100	10	TBD	NL	NL
2-Chlorophenol	8270C	10	100	10	TBD	NL	1**
2-Methylnaphthalene	8270C	10	100	10	TBD	NL	NL
2-Methylphenol	8270C	10	100	10	TBD	200,000*	1**
2-Nitroaniline	8270C	50	500	50	TBD	NL	5
2-Nitrophenol	8270C	10	100	10	TBD	NL	1**
3 & 4 - Methylphenol	8270C	10	100	10	TBD	200000*	1**
3,3´-Dichlorobenzidine	8270C	20	200	20	TBD	NL	5
3-Nitroaniline	8270C	50	500	50	TBD	NL	5
4,6-Dinitro-2-methylphenol	8270C	10	100	10	TBD	NL	1**
4-Bromophenyl phenyl ether	8270C	10	100	10	TBD	NL	NL
4-Chloro-3-methylphenol	8270C	10	100	10	TBD	NL	1**
4-Chloroaniline	8270C	10	100	10	TBD	NL	5
4-Chlorophenyl phenyl ether	8270C	10	100	10	TBD	NL	NL
4-Nitroaniline	8270C	50	500	50	TBD	NL	5
4-Nitrophenol	8270C	50	500	50	TBD	NL	1**
Acenaphthene	8270C	10	100	10	TBD	NL	NL
Acenaphthylene	8270C	10	100	10	TBD	NL	NL
Acetophenone	8270C	10	100	10	TBD	NL	NL
Anthracene	8270C	10	100	10	TBD	NL	NL
Atrazine	8270C	10	100	10	TBD	NL	7.5
Benzaldehyde	8270C	10	100	10	TBD	NL	NL
Benzo[a]anthracene	8270C	10	100	10	TBD	NL	NL
Benzo[a]pyrene	8270C	10	100	10	TBD	NL	Not Detected
Benzo[b]fluoranthene	8270C	10	100	10	TBD	NL	NL
Benzo[g,h,i]perylene	8270C	10	100	10	TBD	NL	NL
Benzo[k]fluoranthene	8270C	10	100	10	TBD	NL	NL
bis(2-Chloroethoxy)methane	8270C	10	100	10	TBD	NL	5
bis(2-chloroethyl)ether	8270C	10	100	10	TBD	NL	1
bis(2-chloroisopropyl)ether	8270C	10	100	10	TBD	NL	5
bis(2-Ethylhexyl)phthalate	8270C	10	100	10	TBD	NL	5
Butyl benzyl phthalate	8270C	10	100	10	TBD	NL	NL
Caprolactam	8270C	10	100	10	TBD	NL	NL
Carbazole	8270C	10	100	10	TBD	NL	NL
Chrysene	8270C	10	100	10	TBD	NL	NL
Dibenz[a,h]anthracene	8270C	10	100	10	TBD	NL	NL
Dibenzofuran	8270C	10	100	10	TBD	NL	NL
Diethyl phthalate	8270C	10	100	10	TBD	NL	NL
Dimethyl phthalate	8270C	10	100	10	TBD	NL	NL
Di-n-butyl phthalate	8270C	10	100	10	TBD	NL	50
Di-n-octyl phthalate	8270C	10	100	10	TBD	NL	NL

Table 2-3. *Laboratory and project QLs and action limits for SVOCs by USEPA Method 8270C in aqueous samples and TCLP leachates*

TCL Target Analytes	USEPA Method	Laboratory QL (ug/L)	Laboratory QL (TCLP Preparation) (ug/L)	Project QL (ug/L)	Laboratory MDL (ug/L)	Maximum Concentration of Contaminants for the Toxicity Characteristic (ug/L)	Groundwater GA Screening Criteria (ug/L)
Fluoranthene	8270C	10	100	10	TBD	NL	NL
Fluorene	8270C	10	100	10	TBD	NL	NL
Hexachlorobenzene	8270C	10	100	10	TBD	130	0.04
Hexachlorobutadiene	8270C	10	100	10	TBD	500	0.5
Hexachlorocyclopentadiene	8270C	10	100	10	TBD	NL	5
Hexachloroethane	8270C	10	100	10	TBD	3,000	5
Indeno[1,2,3-cd]pyrene	8270C	10	100	10	TBD	NL	NL
Isophorone	8270C	10	100	10	TBD	NL	NL
Naphthalene	8270C	10	100	10	TBD	NL	NL
Nitrobenzene	8270C	10	100	10	TBD	2,000	0.4
N-Nitroso-di-n-propylamine	8270C	10	100	10	TBD	NL	NL
N-Nitrosodiphenylamine	8270C	10	100	10	TBD	NL	NL
Pentachlorophenol	8270C	50	500	50	TBD	100,000	1**
Phenanthrene	8270C	10	100	10	TBD	NL	NL
Phenol	8270C	10	100	10	TBD	NL	1**
Pyrene	8270C	10	100	10	TBD	NL	NL
Pyridine	8270C	10	100	10	TBD	5,000	NL

Notes:

MDLs indicate method detection limits.

QLs indicates practical quantitation limits.

TCLP indicates toxicity characteristic leachate procedure

Target compound list (TCL) resource - SOMO1.2.

Maximum Concentration of Contaminants for the Toxicity Characteristic concentrations current as of April 2008

TBD indicates to be determined.

NL indicates not listed.

ug/L indicates micrograms per liter.

** Included in "Phenolic Compounds" standard, which is total sum of phenolic compounds for GA and SW type E(WS).

***Standard of 10ug/L applies to the sum of each isomer.

MDLs and QLs will be obtained from the laboratory at a future date

TCLP assumes leachate is generated using 100g of sample; leachate is diluted 1:10 for sample preparation.

*TCLP maximum concentration is total for 2-methylphenol and 3/4-methylphenols since these compounds cannot be adequaetly resolved.

Method reference:

1. United States Environmental Protection Agency (USEPA). 2004. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846, 3rd Edition, Update IIIB. Washington D.C.

Action limit reference:

Groundwater GA indicates New York State Class GA Ground Water Standards current as of January 2010, Table 1 (section 703.5)

Table 2-4. *Laboratory and project QLs and action limits for SVOCs by USEPA Method 8270C in soil / sediment samples*

TCL Target Analytes	USEPA Method	Laboratory QL (ug/kg)	Project QL (ug/kg)	Laboratory MDL (ug/kg)	Industrial SCOs (ug/kg)	Human Health Bioaccumulation Sediment Criteria (ug/gOC)	Benthic Aquatic Life Chronic Toxicity Sediment Criteria (ug/gOC)	Wildlife Bioaccumulation Sediment Criteria (ug/gOC)
1,1´-Biphenyl	8270C	330	330	TBD	NL	NL	NL	NL
1,2,4,5-Tetrachlorobenzene	8270C	1670	1670	TBD	NL	NL	NL	NL
2,3,4,6-Tetrachlorophenol	8270C	1670	1670	TBD	NL	NL	0.6	NL
2,4,5-Trichlorophenol	8270C	1670	1670	TBD	NL	NL	0.6	NL
2,4,6-Trichlorophenol	8270C	330	330	TBD	NL	NL	0.6	NL
2,4-Dichlorophenol	8270C	330	330	TBD	NL	NL	0.6	NL
2,4-Dimethylphenol	8270C	330	330	TBD	NL	NL	NL	NL
2,4-Dinitrophenol	8270C	1670	1670	TBD	NL	NL	NL	NL
2,4-Dinitrotoluene	8270C	330	330	TBD	NL	NL	NL	NL
2,6-Dinitrotoluene	8270C	330	330	TBD	NL	NL	NL	NL
2-Chloronaphthalene	8270C	330	330	TBD	NL	NL	NL	NL
2-Chlorophenol	8270C	330	330	TBD	NL	NL	NL	NL
2-Methylnaphthalene	8270C	330	330	TBD	NL	NL	34	NL
2-Methylphenol	8270C	330	330	TBD	1,000,000	NL	NL	NL
2-Nitroaniline	8270C	1670	1670	TBD	NL	NL	NL	NL
2-Nitrophenol	8270C	330	330	TBD	NL	NL	NL	NL
3,3´-Dichlorobenzidine	8270C	660	660	TBD	NL	NL	NL	NL
3 & 4 -Methylphenol	8270C	330	330	TBD	1,000,000	NL	NL	NL
3-Nitroaniline	8270C	1670	1670	TBD	NL	NL	NL	NL
4,6-Dinitro-2-methylphenol	8270C	1670	1670	TBD	NL	NL	NL	NL
4-Bromophenyl phenyl ether	8270C	330	330	TBD	NL	NL	NL	NL
4-Chloro-3-methylphenol	8270C	330	330	TBD	NL	NL	NL	NL
4-Chloroaniline	8270C	330	330	TBD	NL	NL	NL	NL
4-Chlorophenyl phenyl ether	8270C	330	330	TBD	NL	NL	NL	NL
4-Nitroaniline	8270C	1670	1670	TBD	NL	NL	NL	NL
4-Nitrophenol	8270C	1670	1670	TBD	NL	NL	NL	NL
Acenaphthene	8270C	330	330	TBD	1,000,000	NL	140	NL
Acenaphthylene	8270C	330	330	TBD	1,000,000	NL	NL	NL
Acetophenone	8270C	330	330	TBD	NL	NL	NL	NL
Anthracene	8270C	330	330	TBD	1,000,000	NL	107	NL
Atrazine	8270C	330	330	TBD	NL	NL	NL	NL
Benzaldehyde	8270C	330	330	TBD	NL	NL	NL	NL
Benzo[a]anthracene	8270C	330	330	TBD	11,000	NL	12	NL
Benzo[a]pyrene	8270C	330	330	TBD	1100	1.3	NL	NL
Benzo[b]fluoranthene	8270C	330	330	TBD	11,000	NL	NL	NL
Benzo[g,h,i]perylene	8270C	330	330	TBD	1,000,000	NL	NL	NL
Benzo[k]fluoranthene	8270C	330	330	TBD	110,000	NL	NL	NL
bis(2-Chloroethoxy)methane	8270C	330	330	TBD	NL	NL	NL	NL
bis(2-chloroethyl)ether	8270C	330	330	TBD	NL	0.03	NL	NL
bis(2-chloroisopropyl)ether	8270C	330	330	TBD	NL	NL	NL	NL
bis(2-Ethylhexyl)phthalate	8270C	330	330	TBD	NL	NL	199.5	NL
Butyl benzyl phthalate	8270C	330	330	TBD	NL	NL	NL	NL
Caprolactam	8270C	330	330	TBD	NL	NL	NL	NL
Carbazole	8270C	330	330	TBD	NL	NL	NL	NL
Chrysene	8270C	330	330	TBD	110,000	NL	NL	NL
Dibenz[a,h]anthracene	8270C	330	330	TBD	1100	NL	NL	NL
Dibenzofuran	8270C	330	330	TBD	NL	NL	NL	NL
Diethyl phthalate	8270C	330	330	TBD	NL	NL	NL	NL
Dimethyl phthalate	8270C	330	330	TBD	NL	NL	NL	NL
Di-n-butyl phthalate	8270C	330	330	TBD	NL	NL	NL	NL
Di-n-octyl phthalate	8270C	330	330	TBD	NL	NL	NL	NL
Fluoranthene	8270C	330	330	TBD	1,000,000	NL	1,020	NL
Fluorene	8270C	330	330	TBD	1,000,000	NL	8	NL
Hexachlorobenzene	8270C	330	330	TBD	12,000	0.15	5,570	12
Hexachlorobutadiene	8270C	330	330	TBD	NL	0.3	5.5	4
Hexachlorocyclopentadiene	8270C	330	330	TBD	NL	NL	4.4	NL
Hexachloroethane	8270C	330	330	TBD	NL	NL	NL	NL
Indeno[1,2,3-cd]pyrene	8270C	330	330	TBD	11,000	NL	NL	NL

Table 2-4. *Laboratory and project QLs and action limits for SVOCs by USEPA Method 8270C in soil / sediment samples*

TCL Target Analytes	*USEPA Method*	*Laboratory QL (ug/kg)*	*Project QL (ug/kg)*	*Laboratory MDL (ug/kg)*	*Industrial SCOs (ug/kg)*	*Human Health Bioaccumulation Sediment Criteria (ug/gOC)*	*Benthic Aquatic Life Chronic Toxicity Sediment Criteria (ug/gOC)*	*Wildlife Bioaccumulation Sediment Criteria (ug/gOC)*
Isophorone	8270C	330	330	TBD	NL	NL	NL	NL
Naphthalene	8270C	330	330	TBD	1,000,000	NL	30	NL
Nitrobenzene	8270C	330	330	TBD	NL	NL	NL	NL
N-Nitroso-di-n-propylamine	8270C	330	330	TBD	NL	NL	NL	NL
N-Nitrosodiphenylamine	8270C	330	330	TBD	NL	NL	NL	NL
Pentachlorophenol	8270C	1670	1670	TBD	55,000	NL	40	NL
Phenanthrene	8270C	330	330	TBD	1,000,000	NL	120	NL
Phenol	8270C	330	330	TBD	1,000,000	NL	0.5	NL
Pyrene	8270C	330	330	TBD	1,000,000	NL	961	NL
Pyridine	8270C	330	330	TBD	NL	NL	NL	NL

Notes:

MDLs indicate method detection limits.

QLs indicates practical quantitation limits.

Target compound list (TCL) resource - SOMO1.2.

TBD indicates to be determined.

ug/kg indicates micrograms per kilogram.

mg/kg indicates milligrams per kilogram.

NL indicates not listed.

MDLs and QLs will be obtained from the laboratory at a future date

Screening criteria current as of January 2010.

Method reference:

1. United States Environmental Protection Agency (USEPA). 2004. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846, 3rd Edition, Update IIIB. Washington D.C.

Action limit references:

SCOs indicates NYSDEC 6 NYCRR Part 375 soil cleanup objectives current as of January 2010.

Sediment criteria taken from Technical Guidance for Screening Contaminated Sediments (NYSDEC, January 1999)

Table 2-5. *Laboratory and project QLs and action limits for PCBs by USEPA Method 8082 in aqueous samples*

TCL Target Analyte	*USEPA Method*	*Laboratroy QL (ug/L)*	*Project QL (ug/L)*	*Laboratory MDL (ug/L)*	Groundwater GA (ug/L)
Aroclor 1016	8082	0.5	0.09	TBD	0.09
Aroclor 1221	8082	0.5	0.09	TBD	0.09
Aroclor 1232	8082	0.5	0.09	TBD	0.09
Aroclor 1242	8082	0.5	0.09	TBD	0.09
Aroclor 1248	8082	0.5	0.09	TBD	0.09
Aroclor 1254	8082	0.5	0.09	TBD	0.09
Aroclor 1260	8082	0.5	0.09	TBD	0.09
Aroclor 1262	8082	0.5	0.09	TBD	0.09
Aroclor 1268	8082	0.5	0.09	TBD	0.09

Notes:

QLs indicates practical quantitation limits.

MDLs indicate method detection limits.

Project QL indicates QL goal to meet project requirements.

Target compound list (TCL) list resource - SOMO1.2.

TBD indicates to be determined.

ug/L indicates micrograms per liter.

NL indicates not listed.

NA indicates not applicable.

MDLs and QLs will be obtained from the laboratory at a future date

Screening criteria current as of January 2010.

Method reference:

1. United States Environmental Protection Agency (USEPA). 2004. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846, 3rd Edition, Update IIIB. Washington D.C.

Action limit reference:

Groundwater GA indicates New York State Class GA Ground Water Standards, current as of January 2010, Table 1 (section 703.5)

Table 2-6. *Laboratory and project QLs and action limits for PCBs by USEPA Method 8082 in soil / sediment samples*

TCL Target Analytes	*USEPA Method*	*Laboratory Low Level QL (ug/kg)*	*Project QL (ug/kg)*	*Laboratory MDL (ug/kg)*	*Industrial SCOs (ug/kg)*	*Human Health Bioaccumulation Sediment Criteria (ug/gOC)*	*Benthic Aquatic Life Chronic Toxicity Sediment Criteria (ug/gOC)*	*Wildlife Bioaccumulation Sediment Criteria (ug/gOC)*
Aroclor 1016	8082	17	17	TBD	25,000	0.0008	19.3	1.4
Aroclor 1221	8082	17	17	TBD	25,000	0.0008	19.3	1.4
Aroclor 1232	8082	17	17	TBD	25,000	0.0008	19.3	1.4
Aroclor 1242	8082	17	17	TBD	25,000	0.0008	19.3	1.4
Aroclor 1248	8082	17	17	TBD	25,000	0.0008	19.3	1.4
Aroclor 1254	8082	17	17	TBD	25,000	0.0008	19.3	1.4
Aroclor 1260	8082	17	17	TBD	25,000	0.0008	19.3	1.4
Aroclor 1262	8082	17	17	TBD	25,000	0.0008	19.3	1.4
Aroclor 1268	8082	17	17	TBD	25,000	0.0008	19.3	1.4

Notes:

QLs indicates practical quantitation limits.

MDLs indicate method detection limits.

Project QL indicates QL goal to meet project requirements.

Target compound list (TCL) resource - SOMO1.2.

TBD indicates to be determined.

ug/kg indicates micrograms per killogram.

MDLs and QLs will be obtained from the laboratory at a future date

Screening criteria current as of January 2010.

Method reference:

1. United States Environmental Protection Agency (USEPA). 2004. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846, 3rd Edition, Update IIIB. Washington D.C.

Action limit reference:

SCOs indicates 6 NYCRR Part 375 soil cleanup objectives, current as of January 2010.

Sediment criteria taken from Technical Guidance for Screening Contaminated Sediments (NYSDEC, January 1999)

Table 2-7. *Laboratory and project QLs and action limits for metals by USEPA Method 6010B, mercury by USEPA Method 7470A, and cyanide by USEPA Method 9012A in aqueous samples and TCLP Leachates.*

TAL Target Analytes	*Method*	*Laboraotry QL (ug/L)*	*Laboratory QL (TCLP Preparation) (ug/L)*	*Project QL (ug/L)*	*Laboratory MDL (ug/L)*	*Maximum Concentration of Contaminants for the Toxicity Characteristic (ug/L)*	*Ground water GA Screening Criteria (ug/L)*
Aluminum	6010B	100.0	500.0	100.0	TBD	NL	NL
Antimony	6010B	60.0	300.0	3	TBD	NL	3
Arsenic	6010B	10.0	50.0	10.0	TBD	5,000	25
Barium	6010B	100.0	500.0	100.0	TBD	100,000	1000
Beryllium	6010B	10.0	50.0	10.0	TBD	NL	NL
Cadmium	6010B	10.0	50.0	5	TBD	1,000	5
Calcium	6010B	1000.0	5000.0	1000.0	TBD	NL	NL
Chromium	6010B	10.0	50.0	10.0	TBD	5,000	50
Cobalt	6010B	50.0	250.0	50.0	TBD	NL	NL
Copper	6010B	10.0	50.0	10.0	TBD	NL	200
Iron	6010B	50.0	250.0	50.0	TBD	NL	300
Lead	6010B	10.0	50.0	10.0	TBD	5,000	25
Magnesium	6010B	1000.0	5000.0	1000.0	TBD	NL	NL
Manganese	6010B	50.0	250.0	50.0	TBD	NL	300
Mercury	7470A	0.2	0.4	0.2	TBD	200	0.7
Nickel	6010B	50.0	250.0	50.0	TBD	NL	100
Potassium	6010B	5000.0	25000.0	5000.0	TBD	NL	NL
Selenium	6010B	10.0	50.0	10	TBD	1,000	10
Silver	6010B	10.0	50.0	10.0	TBD	5,000	50
Sodium	6010B	1000.0	5000.0	1000.0	TBD	NL	20,000
Thallium	6010B	20.0	100.0	20.0	TBD	NL	NL
Vanadium	6010B	50.0	250.0	50.0	TBD	NL	NL
Zinc	6010B	20.0	100.0	20.0	TBD	NL	NL
Cyanide	9012A	10.0	10*	10.0	TBD	NL	200

Notes:

MDLs indicate method detection limits.

QLs indicates practical quantitation limits.

Project QL indicates QL goal to meet project requirements.

TCLP indicates toxicity characteristic leachate procedure

Target Analyte List resource - ILM05.4.

TBD indicates to be determined.

ug/L indicates micrograms per liter.

NL indicates not listed

MDLs and QLs will be obtained from the laboratory at a future date

*Cyanide requires an ASTM leachate

TCLP assumes leachate is generated using 100g of sample; leachate is diluted 1:5 for sample analysis.

Screening criteria current as of January 2010.

*Beryllium criteria is 11ug/L when hardness is less or equal to 75ppm; 1,100ug/L when hardness is greater than 75 ppm.

Method reference:

1. United States Environmental Protection Agency (USEPA). 2004. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846, 3rd Edition, Update IIIB. Washington D.C.

Action limit references:

Maximum Concentration of Contaminants for the Toxicity Characteristic concentrations, current as of January 2010.

Groundwater GA indicates New York State Class GA Ground Water Standards, current as of January 2010, Table 1 (section 703.5)

Table 2-8. *Laboratory and project QLs and action limits for metals by USEPA Method 6010B, mercury by USEPA Method 7471A, cyanide by USEPA Method 9012A, TOC by Lloyk Kahn, Ignitability, Corrosivity, and Reactivity in soil / sediment samples.*

TAL Target Analytes	*Method (Reference)*	*Labortory QL (mg/kg)*	*Project QL (mg/kg)*	*Laboratory MDL (mg/kg)*	*Industrial SCOs (mg/kg)*	*Lowest Effect Level (ug/gOC)*
Aluminum	6010B (1)	10	10	TBD	NL	NL
Antimony	6010B (1)	6	6	TBD	NL	2
Arsenic	6010B (1)	1	1	TBD	16	6
Barium	6010B (1)	10	10	TBD	10,000	NL
Beryllium	6010B (1)	1	1	TBD	2,700	NL
Cadmium	6010B (1)	1	1	TBD	60	0.6
Calcium	6010B (1)	100	100	TBD	NL	NL
Chromium	6010B (1)	1	1	TBD	6,800	26
Cobalt	6010B (1)	5	5	TBD	NL	NL
Copper	6010B (1)	1	1	TBD	10,000	16
Iron	6010B (1)	5	5	TBD	NL	2%
Lead	6010B (1)	1	1	TBD	3,900	31
Magnesium	6010B (1)	100	100	TBD	10,000	NL
Manganese	6010B (1)	5	5	TBD	NL	460
Mercury	7471A (1)	0.1	0.1	TBD	5.7	0.15
Nickel	6010B (1)	5	5	TBD	10,000	16
Potassium	6010B (1)	500	500	TBD	NL	NL
Selenium	6010B (1)	1	1	TBD	6,800	NL
Silver	6010B (1)	1	1	TBD	6,800	1
Sodium	6010B (1)	100	100	TBD	NL	NL
Thallium	6010B (1)	2	2	TBD	NL	NL
Vanadium	6010B (1)	5	5	TBD	NL	NL
Zinc	6010B (1)	2	2	TBD	10,000	120
Total Cyanide	9012A (1)	0.5	0.5	TBD	10,000	NL
TOC	Lloyd Kahn (2)	134.8	134.8	TBD	NL	NL
Ignitability	1010/1020A/1030 (1)	NA	NA	TBD	NL	NL
Corrosivity	9040B/9045B (1)	NA	NA	TBD	NL	NL
Reactivity*	Chapter 7 (1)	25.0	25.0	TBD	NL	NL

Notes:

MDLs indicate method detection limits.

QLs indicates practical quantitation limits.

Project QL indicates QL goal to meet project requirements.

NA indicates not applicable.

Target Analyte List (TAL) resource - ILM05.4.

TBD indicates to be determined.

mg/kg indicates milligrams per kilogram.

MDLs and QLs will be obtained from the laboratory at a future date

* Indicates that data generated may not be usable due to unacceptable quality control results associated with this method.

Screening criteria current as of January 2010.

Method references:

1. United States Environmental Protection Agency (USEPA). 2004. *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846*, 3rd Edition, Update IIIB. Washington D.C.

2. United States Environmental Protection Agency (USEPA). 1996. *Determination of Total Organic Carbon in Sediment (Lloyd Kahn Method).* USEPA Region II, Environmental Services Division, Monitoring Management Branch, Edison, New Jersey

Action limit reference:

SCOs indicates 6 NYCRR Part 375 soil cleanup objectives, current as of January 2010.

Sediment criteria taken from Technical Guidance for Screening Contaminated Sediments (NYSDEC, January 1999)

Table 3-1. *VOCs using USEPA Methods 8000C/8260B quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
		For aqueous samples: Analyze within 14 days from collection for preserved samples. Analysis within 7 days from collection to analysis for samples not acid preserved. For solid samples within 48 hours from collection: Sample aliquot extruded from EnCore® sampler. Either sample is frozen (for low level preparation) until analysis, or methanol is added and the sample preserved at 4°C (for medium level preparation) until analysis. Analysis within 14 days from collection. If not prepared as described above, then 48 hours from collection to analysis. For sodium bisulfate preserved vials: Analysis must be performed within 14 days from collection. Withdrawn by USEPA- For bulk sampling technique: Analysis must be performed within 14 days from collection. For TCLP preparation, 14 days from collection to TCLP extract generation and 14 days from TCLP extract generation to analysis.	1. If holding times are exceeded for initial or any re-analyses required due to QC excursions. 2. Notify QA Officer since re-sampling may be required. 3. Document corrective action in the case narrative.
Solid sample collection	Samples must be prepared using USEPA Method 5035	NA	NA
GC/MS Instrument Performance Check	Once every 12 hours prior to initial calibration and calibration verifications. Analytical sequence must be completed within 12 hours of the GC/MS Instrument Performance Check	1. Bromofluorobenzene (BFB) key ions and abundance criteria listed in the method must be met for all 9 ions and analyses must be performed within 12 hours of injection of the BFB. 2. Part of the BFB peak will not be background subtracted to meet tune criteria. 3. Documentation of all BFB analyses and evaluation must be included in the data packages.	1. Tune the mass spectrometer. 2. Document corrective action in the case narrative. 3. Samples cannot be analyzed until control limit criteria have been met.

Source: O’Brien & Gere

Table 3-1. *VOCs using USEPA Methods 8000C/8260B quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Initial Calibration	Prior to sample analysis and when calibration verifications criteria are not met. Initial calibration will contain all target analytes in each standard. Quantitation of analyses will utilize the initial calibration results.	1. Five concentrations bracketing expected concentration range for all compounds of interest. 2. One second-source standard must be analyzed immediately following the initial calibration at the mid-calibration concentration. This standard must be within 30% recovery or within laboratory control limits. It is also recommended that a separate standard at the MDL level be analyzed after calibration is complete to check sensitivity. 3. Response factor (RF) as listed in Method 8260B, with remaining RFs factor ≥ 0.050 except for ketones with allowable response factor ≥ 0.010. 4. For compound with %RSD >15, quantitation must be performed using a separate calibration curve and the Coefficient of Determination (COD) must be ≥ 0.990.	1. Identify and correct problem. 2. If criteria are still not met, recalibrate. 3. Document corrective action in the case narrative. 4. Samples should not be analyzed until calibration control limit criteria are met. 5. Contact QA Officer to discuss problem target analytes before proceeding with analysis.
Calibration Verification	Every 12 hours, following BFB. Calibration verification will contain all target analytes in each standard at a concentration that is representative of the midpoint of the initial calibration.	1. Within percent drift or percent difference (%D) of ≤ 20 for all compounds. RF requirements are the same as listed in the initial calibration. 2. The internal standards areas and retention times must meet the method criteria.	1. Reanalyze. 2. If criteria are still not met, identify and correct problem, recalibrate. 3. Document corrective action in the case narrative; samples should not be analyzed until calibration control limit criteria are met.
Preparation Blank Analysis	Every 12 hours, following calibration verification	Methylene chloride less than 3 times QL, 2-butanone and acetone less than 5 times QL. Remaining analytes less than QL. QLs and MDLs will be provided along with the preparation blank results.	1. Reanalyze blank. 2. If limits are still exceeded, clean instrument, recalibrate analytical system, and reanalyze all samples if detected for same compounds as in blank. 3. Document corrective action in the case narrative - samples cannot be analyzed until blank criteria have been met.
Field/Equipment Blank Analysis	Collected one per sampling event, or one per 20 samples or one per matrix (for less than 20 samples)	Methylene chloride less than 3 times QL, 2-butanone and acetone less than 5 times QL. Remaining analytes less than QL. QLs and MDLs will be provided along with the preparation blank results.	1. Investigate problem. 2. Document in the case narrative.
Trip Blank	1 per cooler containing VOC samples.	Methylene chloride less than 3 times QL, 2-butanone and acetone less than 5 times QL. Remaining analytes less than QL. QLs and MDLs will be provided along with the preparation blank results.	1. Investigate problem. 2. Document in the case narrative.

Source: O’Brien & Gere

Table 3-1. *VOCs using USEPA Methods 8000C/8260B quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Laboratory Control Sample (LCS) or Matrix Spike Blank (MSB) Analysis	Each analytical batch (every 12 hours). Prepared independently from calibration standards. LCS or MSB must contain all target analytes and should be at a concentration, which is in the lower 1/2 of the calibration curve.	Recovery within laboratory control limits. For compounds without established laboratory control limits, 70-130% recovery will be used. The lowest acceptable control limits for recovery will be 10%.	1. If recovery failures are above control limits and these compounds are not detected in the associated samples, corrective action is not required. 2. If recovery failures are below control limits, reanalyze LCS and examine results of other QC analyses. 3. If other QC criteria have not been met, stop analysis, locate and correct problem, recalibrate instrument and reanalyze samples since last satisfactory LCS. 4. Document corrective action in the case narrative.
Internal Standards	All samples and blanks (including MS/MSD)	1. Response -50% - +200% of internal standards from continuing calibration of the day. 2. RT must be ± 30 sec. from associated calibration verification standard of that sequence.	1. Reanalyze. 2. If still outside of the limits, report both analyses. 3. Document corrective action in the case narrative.
Surrogate Spike	All samples and blanks (including MS/MSD)	Recovery within laboratory control limits. The lowest acceptable control limits for recovery will be 10%.	1. Reanalyze any environmental or QC sample with surrogates that exceed control limits. 2. If still outside of the limits, report both analyses. 3. Document corrective action in the case narrative.
Matrix Spike/ Matrix Spike Dup. (MS/MSD) Analysis	Collected one per 20 samples or one per matrix (for less than 20 samples) Samples from the investigation must be used for MS/MSD analysis. Spike must contain complete list of target analytes.	Recovery and RPD within laboratory control limits. For compounds without established laboratory control limits, 70-130% recovery will be used. The lowest acceptable control limits for recovery will be 10%.	1. Reanalyze if <10%. 2. If reanalysis is still <10%, report both analyses and document in the case narrative. 3. If >10% and LCS criteria are met, document in case narrative; no additional corrective action required. 4. If LCS criteria are exceeded also, examine other QC data for source of problem; *i.e.,* surrogate recoveries for extraction efficiency and calibration data for instrument performance issues. 5. Reanalyze samples and associated MS/MSD and LCSs as required. 6. Document corrective action in the case narrative
Field Dup. Analysis	Collected one per 20 samples or one per matrix (for less than 20 samples) Field duplicate will not be identified to the laboratory.	Validation criteria: 50% RPD for waters, 100% RPD for solids. For sample results that are less than or equal to five times the QL, the criterion of plus or minus two times the QL will be applied to evaluate field duplicates.	No corrective action required of the laboratory since the laboratory will not know the identity of the field duplicate samples. If these criteria are not met, sample results will be evaluated on a case-by-case basis.

Source: O'Brien & Gere

Table 3-1. *VOCs using USEPA Methods 8000C/8260B quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Target Analyte Identification	As required for identification of target analytes	1. The intensities of the characteristic ions of a compound maximize in the same scan or within one scan of each other. Selection of a peak by a data system target compound search routine where the search is based on the presence of a target chromatographic peak containing ions specific for the target compound at a compound-specific retention time will be accepted as meeting this criterion. 2. The relative retention time (RRT) of the sample component is within ± 0.06 RRT units of the RRT of the standard component. 3. The relative intensities of the characteristic ions agree within 30% of the relative intensities of these ions in the reference spectrum. (Example: For an ion with an abundance of 50% in the reference spectrum, the corresponding abundance in a sample spectrum can range between 20% and 80%.) 4. Structural isomers that produce very similar mass spectra should be identified as individual isomers if they have sufficiently different GC retention times 5. Identification is hampered when sample components are not resolved chromatographically and produce mass spectra containing ions contributed by more than one analyte. When gas chromatographic peaks obviously represent more than one sample component (i.e., a broadened peak with shoulder(s) or a valley between two or more maxima), appropriate selection of analyte spectra and background spectra is important.	Not applicable
Target Analyte Identification	As required for identification of target analytes	Examination of extracted ion current profiles of appropriate ions can aid in the selection of spectra, and in qualitative identification of compounds. When analytes co-elute (i.e., only one chromatographic peak is apparent), the identification criteria may be met, but each analyte spectrum will contain extraneous ions contributed by the coeluting compound.	Not applicable
Target Analyte Quantitation	Apply USEPA Method 8000C for medium level extraction technique	Moisture correction in accordance with USEPA Method 8000C will be applied to the complete set of solid samples, regardless of the percent moisture content..	Not applicable
Tentatively Identified Compound	Report 10 VOCs for each sample and blank analysis. Non-target compounds will be reported using a Mass Spectral Library search.	Not applicable	Not applicable

Source: O'Brien & Gere

Table 3-1. *VOCs using USEPA Methods 8000C/8260B quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Dilutions	1. When target analyte concentration exceeds upper limit of calibration curve. 2. When matrix interference is demonstrated by the lab and documented in the case narrative (highly viscous samples or a large number of nontarget peaks on the chromatogram). 3. It is recommended that a reagent blank be analyzed if an analyte saturates the detector or if highly concentrated analytes are detected. Otherwise data impacted from carryover cannot be used. 4. Laboratory will note in the data deliverables which analytical runs were reported.	1. The reagent blank will meet the method blank criteria.	1. Reanalyze reagent blank until method blank criteria are met. 2. Document corrective action in the case narrative.
Percent solids	For soil samples, the percent solids will be determined and sample results will be corrected for percent solids.	Not applicable	Not applicable
pH Determination	Once sample aliquot is taken from the VOC vial, the pH of water samples must be determined.	Record pH and report in the case narrative.	Not applicable
Sample Batching	The laboratory will batch project samples together along with QC samples specified from the project. Non-project information will not be included in the data packages.	Not applicable	Not applicable
Laboratory control limits	Generated with results for an analyte from a minimum of 20 sample analyses. The average of the sample results and the standard deviation are calculated. The internal warning limits are established at 2 times the standard deviation and the control limits are established at 3 times the standard deviation. The control limits are updated annually.	Not applicable	Not applicable
Deliverables	1. NYSDEC Category B deliverables must be provided to document each audit item for easy reference and inspection. 2. An example calculation will be provided for each analysis, for each type of matrix in the data package using samples from the project. 3. Any laboratory abbreviations or notations presented in the raw data or summary information will be explained or referenced in the case narrative. 4. Final spiking concentrations will be presented in summary form. 5. Standard tracing information will be provided. 6. Cooler temperatures and any observations of bubbles in sample containers will be provided in the data packages. 7. Run logs will be provided in the data packages.	Not applicable	Provide missing or additional deliverables for validation purposes.

Source: O'Brien & Gere

Table 3-1. *VOCs using USEPA Methods 8000C/8260B quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Method and QAPP requirements	The laboratory will perform the method as presented in this QAPP and will adhere to the QAPP requirements presented herein. Otherwise the laboratory will specifically note any procedures that differ from the method or the QAPP in the data package case narrative.	Not applicable	Not applicable

Notes:

Data validation will be performed in accordance with QA/QC criteria established in these tables and the analytical methods. Excursions from QA/QC criteria will be qualified based on guidance provided in this QAPP.

Communications with O'Brien & Gere will be documented and included in the data packages.

Source: O'Brien & Gere

Source: O'Brien & Gere

Table 3-2. *SVOCs using USEPA Method 8000C/8270C quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Holding Times	Samples must be extracted and analyzed within holding time.	Extract within 7 days from collection for aqueous samples; 14 days for soil samples. Analyze extracts within 40 days of extraction. For TCLP preparation, 14 days from collection to TCLP extract generation and 7 days from TCLP extract generation to SVOC extraction. 40 days from SVOC extraction to analysis.	If holding times are exceeded for initial or any re-analyses required due to QC excursions, notify the QA Officer since re-sampling may be required.
GC/MS Instrument Performance Check	Once every 12 hours prior to initial calibration and calibration verification. Must contain 50ng/uL of 4,4-DDT, pentachlorophenol, and benzidine. Analytical sequence must be completed within 12 hours of the GC/MS Instrument Performance Check	1. Decafluorotriphenylphosphine (DFTPP) key ions and abundance criteria listed in the method must be met for all 13 ions and analyses must be performed within 12 hours of injection of the DFTPP. 2. Part of the DFTPP peak will not be background subtracted to meet tune criteria. 3. Documentation of all DFTPP analyses and evaluations must be included in the data packages. 4. Degradation of 4,4-DDT <20%. Peak tailing must not be evident.	1. Tune the mass spectrometer. 2. Document corrective action in the case narrative - samples cannot be analyzed until control limit criteria have been met.
Initial Calibration	Prior to sample analysis and when calibration verification criteria are not met. Initial calibration will contain all target analytes in each standard. Quantitation of analyses will utilize the initial calibration results.	1. Five concentrations bracketing expected concentration range for all compounds of interest. 2. One second-source standard must be analyzed immediately following the initial calibration at the mid-calibration concentration. This standard must be within 30% recovery or within laboratory control limits. It is also recommended that a separate standard at the MDL level be analyzed after calibration is complete to check sensitivity. 3. Response factors must meet criteria listed in Method 8270C with the remaining RFs 0.05 with allowable response factor for n-nitroso-di-n-propylamine and 2,4-dimethylphenol of 0.01. 4. For compounds with %RSD >15, quantification must be performed using a separate calibration curve and the COD must be ≥ 0.990.	1. Identify and correct problem. 2. If criteria are still not met, recalibrate. 3. Document corrective action in the case narrative - samples should not be analyzed until calibration control limit criteria are met.

Source: O'Brien & Gere

Table 3-2. *SVOCs using USEPA Method 8000C/8270C quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Calibration Verification	Every 12 hours, following DFTPP. Calibration verification will contain all target analytes in each standard at a concentration that is representative of the midpoint of the initial calibration.	1. Within method specified criteria, percent drift or percent difference (%D) ≤ 20 for all compounds. Response factor requirements as listed in initial calibration. 2. The internal standards areas and retention times must meet the method criteria.	1. Reanalyze. 2. If criteria are still not met, identify and correct problem, recalibrate. 3. Document corrective action in the case narrative - samples should not be analyzed until calibration control limit criteria are met.
Preparation Blank Analysis	Prepared with each extraction batch of no more than 20 analytical samples.	1. Common laboratory contaminants (phthalate) less than 5 x QL. Remaining analytes less than QL. 2. QLs and MDLS will be provided along with the preparation blank results.	1. Reanalyze blank. 2. If limits are still exceeded, clean instrument, recalibrate analytical system and re-extract and reanalyze all samples if detected for same compounds as in the blank. 3. Document corrective action in the case narrative - samples should not be analyzed until blank criteria have been met.
Field/ Equipment Blank Analysis	Collected one per sampling event, or one per 20 samples or one per matrix (for less than 20 samples)	1. Common laboratory contaminants (phthalate) less than 5 x QL. Remaining analytes less than QL. 2. QLs and MDLS will be provided along with the blank results.	1. Investigate problem. 2. Document in the case narrative.

Source: O'Brien & Gere

Table 3-2. *SVOCs using USEPA Method 8000C/8270C quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Laboratory Control Sample (LCS) or Matrix Spike Blank (MSB) Analysis	Prepared with each extraction batch, of no more than 20 analytical samples. Prepared independently from calibration standards. LCS or MSB must contain all target compounds and should be at a concentration that is approximately in the lower 1/2 of the calibration curve.	Recovery within laboratory control limits. For compounds without established laboratory control limits, 70 to 130% recovery will be used. The lowest acceptable control limits for recovery will be 10%.	1. If recovery failures are above control limits and these compounds are not detected in the associated samples, no corrective action is required. 2. If recovery failures are below the control limits, reanalyze LCS and examine results of other QC analyses. 3. If other QC criteria have not been met, stop analysis, locate and correct problem, recalibrate instrument and reanalyze samples since last satisfactory LCS. 4. Document corrective action in the case narrative.
Internal Standards	All samples and blanks (including MS/MSD).	1. Response -50% - +200% of the internal standards from the continuing cal of the day. 2. RT must be ± 30 sec. from calibration verification of that sequence.	1. Reanalyze. 2. If recovery is still outside criteria, report both analyses. 3. Document corrective action in the case narrative.
Surrogate Spike	All samples and blanks (including MS/MSD).	Recovery within laboratory control limits. The lowest acceptable control limits for recovery will be 10%.	1. Reanalyze if more than 1 AE or 1 BN fails, or if any one surrogate recovery is < 10%. 2. If recovery meets criteria, report both analyses. 3. If re-analysis recovery fails and if the recovery is <10%, re-extract sample if within holding time and re-analyze. 4. If re-analysis recovery fails and if the recovery is >10%, report both analyses. 5. Document corrective action in the case narrative.

Table 3-2. *SVOCs using USEPA Method 8000C/8270C quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Matrix Spike/ Matrix Spike Dup. (MS/MSD) Analysis	Collected one per 20 samples or one per matrix (for less than 20 samples) Samples from the investigation must be used for MS/MSD analysis. Spike must contain complete list of target analytes.	Recovery and RPD within laboratory control limits. For compounds without established laboratory control limits, 70-130% recovery will be used. The lowest acceptable control limits for recovery will be 10%.	1. Reanalyze if <10%. 2. If reanalysis is < 10%, report both analyses and document in the case narrative. 3. If reanalysis is >10%, and LCS criteria are met, document in the case narrative. 4. If LCS criteria are exceeded also, examine other QC data for source of problem; i.e. surrogate recoveries for extraction efficiency and calibration data for instrument performance issues; re-extract or reanalyze samples and associated MS/MSD and LCSs as required.
Field Dup. Analysis	Collected one per 20 samples or one per matrix (for less than 20 samples) Field duplicate will not be identified to the laboratory.	Validation criteria: 50% RPD for waters, 100% RPD for solids. For sample results that are less than or equal to five times the QL, the criterion of plus or minus two times the QL will be applied to evaluate field duplicates.	No corrective action required of the laboratory since the laboratory will not know the identity of the field duplicate samples. If these criteria are not met, sample results will be evaluated on a case-by-case basis.

Source: O'Brien & Gere

Table 3-2. *SVOCs using USEPA Method 8000C/8270C quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Target Analyte Identification	As required for identification of target analytes	1. The intensities of the characteristic ions of a compound maximize in the same scan or within one scan of each other. Selection of a peak by a data system target compound search routine where the search is based on the presence of a target chromatographic peak containing ions specific for the target compound at a compound-specific retention time will be accepted as meeting this criterion. 2. The relative retention time (RRT) of the sample component is within ± 0.06 RRT units of the RRT of the standard component. 3. The relative intensities of the characteristic ions agree within 30% of the relative intensities of these ions in the reference spectrum. (Example: For an ion with an abundance of 50% in the reference spectrum, the corresponding abundance in a sample spectrum can range between 20% and 80%.) 4. Structural isomers that produce very similar mass spectra should be identified as individual isomers if they have sufficiently different GC retention times. 5. Identification is hampered when sample components are not resolved chromatographically and produce mass spectra containing ions contributed by more than one analyte. When gas chromatographic peaks obviously represent more than one sample component (i.e., a broadened peak with shoulder(s) or a valley between two or more maxima), appropriate selection of analyte spectra and background spectra is important. 6. Examination of extracted ion current profiles of appropriate ions can aid in the selection of spectra, and in qualitative identification of compounds. When analytes coelute (i.e., only one chromatographic peak is apparent), the identification criteria may be met, but each analyte spectrum will contain extraneous ions contributed by the coeluting compound.	Not applicable

Source: O'Brien & Gere

Table 3-2. *SVOCs using USEPA Method 8000C/8270C quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Cleanup	Gel permeation chromatography should be performed for water should extracts with high molecular weight contaminants.	Calibrate according to method. Criteria must be met as listed in method for calibration and blank analysis.	Clean GPC column or replace.
Tentatively Identified Compound	Report 20 SVOCs for each sample and blank analysis. Non-target compounds will be reported using a Mass Spectral Library search.	Not applicable	Not applicable
Sample Batching	The laboratory will batch project samples together along with QC samples specified from the project. Non-project information will not be included in the data packages.	Not applicable	Not applicable
Percent solids	For soil/ samples, the percent solids will be determined and sample results will be corrected for percent solids.	Not applicable	Not applicable
Dilutions	1. When target analyte concentration exceed upper limit of calibration curve. 2. When matrix interference demonstrated by lab and documented in the case narrative (highly viscous samples or a large number of non-target peaks on the chromatogram). 3. Samples should be cleaned up during sample preparation/extraction procedure using appropriate methods when matrix interference is present. 4. Laboratory will note in the data deliverables which analytical runs were reported.	Not applicable	Not applicable
Laboratory control limits	1. Generated with results for an analyte from a minimum of 20 sample analyses. The average of the sample results and the standard deviation are calculated. The internal warning limits are established at 2 times the standard deviation and the control limits are established at 3 times the standard deviation. The control limits are updated annually.	Not applicable	Not applicable

Source: O'Brien & Gere

Table 3-2. *SVOCs using USEPA Method 8000C/8270C quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Deliverables	1. NYSDEC Category B deliverables must be provided to document each audit item for easy reference and inspection. 2. An example calculation will be provided for each analysis, for each type of matrix in the data package using samples from the project. 3. Any laboratory abbreviations or notations presented in the raw data or summary information will be explained or referenced in the case narrative. 4. Final spiking concentrations will be presented in summary form. 5. Standard tracing information will be provided. 6. Cooler temperatures will be provided in the data packages. 7. Run logs will be provided in the data packages.	Not applicable	Provide missing or additional deliverables for validation purposes.
Method and QAPP requirements	The laboratory will perform the method as presented in this QAPP and will adhere to the QAPP requirements presented herein. Otherwise the laboratory will specifically note any procedures that differ from the method or the QAPP in the data package case narrative.	Not applicable	Not applicable

Notes:
Data validation will be performed in accordance with QA/QC criteria established in these tables and the analytical methods. Excursions from QA/QC criteria will be qualified based on guidance provided in this QAPP.
Communications with O’Brien & Gere will be documented and included in the data packages.

Source: O’Brien & Gere

Table 3-3. *PCBs using USEPA Method 8000C/8082 quality control requirements and corrective actions.*

Audit	Frequency (Applies to both primary and confirmation columns)	Control Limits (Applies to both primary and confirmation columns)	Laboratory Corrective Action (Applies to both primary and confirmation columns)
Holding Times	Samples must be extracted and analyzed within holding time.	Extract within 7 days from collection for aqueous samples and 14 days from collection for solid samples. Analyze extracts within 40 days of extraction.	1. If holding times are exceeded for initial or any re-analyses required due to QC excursions, notify the QAO immediately since re-sampling may be required. 2. Document corrective action in the case narrative.
Initial Calibration	Prior to start up and when criteria are exceeded for continuing calibration. Quantitation of analyses will utilize the initial calibration results.	1. Minimally five concentrations for Aroclor 1016/1260 (one point calibration for the remaining Aroclors), one calibration standard must be at concentration less than or equal to the QL. 2. Recommended that if results are reported below the QL, a separate standard at the MDL level analyzed after calibration is complete to check sensitivity. 3. If RSD ≤20% the average relative response factor (internal calibration) or average calibration factor (external calibration) is used for quantitation. If RSD >20% a linear regression calibration that does not pass through the origin with a correlation coefficient (r) ≥0.990 is used for quantitation; or a nonlinear first or second order calibration curve with a coefficient of determination (COD) of ≥0.990 is used for quantitation.	1. Identify and correct problem. 2. Recalibrate instrument; samples should not be analyzed until initial calibration criteria are met. 3. Document corrective action in the case narrative.

Source: O'Brien & Gere

***Table 3-3.** PCBs using USEPA Method 8000C/8082 quality control requirements and corrective actions.*

Audit	Frequency (Applies to both primary and confirmation columns)	Control Limits (Applies to both primary and confirmation columns)	Laboratory Corrective Action (Applies to both primary and confirmation columns)
Calibration Verification	Calibration standards must contain Aroclor 1016/1260 at the mid-range concentration. Calibration verification standards must be analyzed every 20 samples and must bracket each end of the sample sequence. In the case that Aroclors are detected above the MDL concentration in the associated samples, the identified Aroclor must be analyzed within the same 48 hour period as the sample in a valid analytical sequence.	Calibration verification response (% difference) or concentration (% drift) ≤ 20%.	1. Reanalyze. 2. If criteria are still not met, identify and correct problem, recalibrate; reanalyze samples back to last compliant calibration standard. Samples must be bracketed by compliant calibration standards. 3. Document corrective action in the case narrative.
Retention Time Windows	Retention time windows (absolute retention time) must be established in accordance with USEPA Method 8000C or relative retention times must be used if internal standards are employed.	Compounds must be within established retention time windows or within laboratory established relative retention time criteria for the succeeding calibration standards. Retention time windows must be provided for each calibration verification. Retention times for each surrogate analyzed for samples and QC samples must be provided on a summary form.	1. Reanalyze. 2. If criteria are still not met, identify and correct problem, recalibrate; reanalyze samples back to last compliant calibration standard. 3. Document corrective action in the case narrative.
Method Blank Analysis	1 per 20 samples of similar matrix extracted at the same time and undergo same cleanup procedures as samples or a separate cleanup blank must be prepared and analyzed.	Compound concentrations must be <QL.	1. Reanalyze. 2. If limits are still exceeded, re-extract and reanalyze method blank and associated samples. Samples must not be analyzed until method blank criteria are met. 3. Document corrective action in the case narrative.

Source: O'Brien & Gere

Table 3-3. *PCBs using USEPA Method 8000C/8082 quality control requirements and corrective actions.*

Audit	Frequency (Applies to both primary and confirmation columns)	Control Limits (Applies to both primary and confirmation columns)	Laboratory Corrective Action (Applies to both primary and confirmation columns)
Instrument Blank Analysis	Must be analyzed at the beginning of 12 hour sequence, following the initial calibration verification standard.	Compound concentrations must be <QL.	1. Reanalyze. 2. If limits are still exceeded, re-extract and reanalyze method blank and associated samples. Samples must not be analyzed until method blank criteria are met. 3. Document corrective action in the case narrative.
Laboratory Control Sample (LCS) or Matrix Spike Blank (MSB) Analysis	1 per 20 samples of similar matrix extracted at the same times. LCS or MSB must be spiked with the Aroclor suspected to be at the site at concentrations near the low end of the calibration curve. Otherwise, Aroclor 1016/1260 or other Aroclors may be used in the LCS analysis.	Percent recoveries must be within laboratory control limits. For compounds without established laboratory control limits, 70-130% recovery will be used. The lowest acceptable control limits for recovery will be 10%.	1. Reanalyze and examine results of other QC analyses. 2. If the percent recovery is above laboratory control limits and the affected compound is not detected in the associated samples, corrective action is not required; document in case narrative. 3. If percent recovery is below laboratory control limits or <10%, reanalyze LCS. If recoveries remain below limits and other QC criteria have been met, report both analyses and document in case narrative report. 4. If recoveries are below laboratory control limits and additional QC excursions are observed, locate and correct problem, recalibrate instrument and re-extract and/or re-analyze samples since last satisfactory LCS. 5. Document corrective action in the case narrative.

Source: O'Brien & Gere

Table 3-3. *PCBs using USEPA Method 8000C/8082 quality control requirements and corrective actions.*

Audit	Frequency (Applies to both primary and confirmation columns)	Control Limits (Applies to both primary and confirmation columns)	Laboratory Corrective Action (Applies to both primary and confirmation columns)
MS/MSD Analysis	1 per 20 samples of similar matrix extracted at the same times. MS/MSDs must be spiked with the Aroclor suspected to be at the site at concentrations near the low end of the calibration curve. Otherwise, Aroclor 1016/1260 or other Aroclors may be used. Samples from the investigation must be used for MS/MSD analysis.	Recovery and RPD within laboratory control limits. For compounds without established laboratory control limits, 70-130% recovery will be used. The lowest acceptable control limits for recovery will be 10%.	1. Reanalyze if <10%. 2. If reanalysis is still <10%, report both analyses and document in the case narrative. 3. If re-analysis is >10% and LCS criteria are met, document in case narrative; no additional corrective action required. 4. If LCS criteria are exceeded also, examine other QC data for source of problem; *i.e.,* surrogate recoveries for extraction efficiency and calibration data for instrument performance issues. 5. Re-extract or reanalyze samples and associated MS/MSD and LCSs as required. 6. Document corrective action in the case narrative.
Surrogate Spike	Samples, blanks, MS/MSDs, and LCSs must be spiked with method specified surrogate compounds on each column used in the analysis.	Recovery within laboratory control limits. Corrective action is not required if one of the four surrogates (for two columns) has recovery outside of control limits if the recovery is >10% and the remaining three surrogates are within control limits. Surrogate recoveries for each surrogate on each column must be provided in a summary form. The lowest acceptable control limits for recovery will be 10%.	1. Reanalyze. 2. If reanalysis recovery fails criteria but is >10%, report both analyses and document in case narrative report. 3. If reanalysis recovery is <10%, re-extract and reanalyze the sample. Special Circumstances. If matrix interference is present (as documented in the case narrative): 1. Reanalyze sample; may be at a higher dilution. 2. Report both analyses. Document corrective action in the case narrative.

***Table 3-3.** PCBs using USEPA Method 8000C/8082 quality control requirements and corrective actions.*

Audit	Frequency (Applies to both primary and confirmation columns)	Control Limits (Applies to both primary and confirmation columns)	Laboratory Corrective Action (Applies to both primary and confirmation columns)
Identification	Samples, blanks, and QC data.	Retention times must be within established retention time windows or must meet relative retention time criteria. Confirmation analysis is required. Retention time windows must be provided for each calibration verification. USEPA CLP Form 10 Summary form, providing the percent difference and retention times for all detected analytes in samples and QC samples, will be provided. Percent difference calculation: Difference between Higher concentration of sample and Lower concentration of sample divided by the Lower concentration of sample times 100.	1. Investigate problem; reanalyze calibration standards to check for retention time shift. 2. Document corrective action in the case narrative.

Source: O'Brien & Gere

Table 3-3. *PCBs using USEPA Method 8000C/8082 quality control requirements and corrective actions.*

Audit	Frequency (Applies to both primary and confirmation columns)	Control Limits (Applies to both primary and confirmation columns)	Laboratory Corrective Action (Applies to both primary and confirmation columns)
Quantitation	Samples, blanks, and QC data.	Confirmation analysis is required. Internal or external standard method may be used. Verify concentration is within linear calibration range of standards. Aroclor concentration is determined using response factor for each of the characteristic peaks and then averaging the five concentrations. Peak areas from five Aroclor peaks unique to the target Aroclor will be used to quantitate the Aroclor concentration. Every effort must be made to meet specified QL requirements. Lab must state the technique used for quantitation of results for the samples.	1. If concentration is above linear calibration range, dilute sample and reanalyze. Dilution should result in concentration in the upper calibration range of the instrument. 2. Document corrective action in the case narrative.
Field/ Equipment Blank Analysis	Collected one per sampling equipment and after every 20 samples.	Compounds concentrations must be <QL.	1. Investigate problem; reanalyze to verify laboratory cross contamination is not a factor. 2. Document in the case narrative.
Field Duplicate Analysis	Collected 1 per matrix type; every 20 samples of similar matrix.	Validation criteria: 50% RPD for waters and 100% RPD for solids. For sample results that are less than or equal to five times the QL, the criterion of plus or minus two times the QL will be applied to evaluate field duplicates.	No corrective action required of the laboratory since the laboratory will not know the identity of the field duplicate samples. If these criteria are not met, sample results will be evaluated on a case-by-case basis during the validation process.

Source: O'Brien & Gere

Table 3-3. *PCBs using USEPA Method 8000C/8082 quality control requirements and corrective actions.*

Audit	Frequency (Applies to both primary and confirmation columns)	Control Limits (Applies to both primary and confirmation columns)	Laboratory Corrective Action (Applies to both primary and confirmation columns)
Chromatography Presentation	For each standard, sample and QC sample analysis.	Copies of chromatograms provided in the data package must be large enough to view during validation; detail of each peak involved in the Aroclor identification, including peak shape and associated baseline. In the case that matrix interference is detected or manual integration is performed, enlarged copies of those manipulations will be included in the data package for review.	1. Provide requested information.
Cleanup	Acid wash clean-up is used for PCB extracts.	Calibrate according to method. Criteria must be met as listed in method.	1. For GPC, perform column maintenance, recalibrate. 2. For florisil, obtain a new lot of cartridges.
Sample Batching	The laboratory will batch project samples together along with QC samples specified from the project. Non-project information will not be included in the data packages. USEPA Form 8 Summary form, providing the date, time of analysis of samples and QC samples, surrogate retention times and surrogate retention time window, will be provided.	Not applicable	Not applicable
Confirmation Analysis	Dual column quantitation and qualitative confirmation will be performed. The information presented in CLP Form 10 will be provided in the data package for evaluation.	Not Applicable	Not Applicable

Source: O'Brien & Gere

***Table 3-3.** PCBs using USEPA Method 8000C/8082 quality control requirements and corrective actions.*

Audit	Frequency (Applies to both primary and confirmation columns)	Control Limits (Applies to both primary and confirmation columns)	Laboratory Corrective Action (Applies to both primary and confirmation columns)
Laboratory control limits	1. Generated with results for an analyte from a minimum of 20 sample analyses. The average of the sample results and the standard deviation are calculated. The internal warning limits are established at 2 times the standard deviation and the control limits are established at 3 times the standard deviation. The control limits are updated annually.	Not applicable	Not applicable
Percent solids	For solids samples, the percent solids will be determined and sample results will be corrected for percent solids.	Not applicable	Not applicable
Dilutions	1. When target analyte concentration exceed upper limit of calibration curve. 2. When matrix interference demonstrated by lab and documented in the case narrative (highly viscous samples or a large number of non-target peaks on the chromatogram). . 3. Samples should be cleaned up during sample preparation/extraction procedure using appropriate methods when matrix interference is present. 4. Laboratory will note in the data deliverables which analytical runs were reported.	1. The reagent blank will meet the method blank criteria.	1. Reanalyze reagent blank until method blank criteria are met.

Source: O'Brien & Gere

Table 3-3. *PCBs using USEPA Method 8000C/8082 quality control requirements and corrective actions.*

Audit	Frequency (Applies to both primary and confirmation columns)	Control Limits (Applies to both primary and confirmation columns)	Laboratory Corrective Action (Applies to both primary and confirmation columns)
Deliverables	1. NYSDEC Category B deliverables must be provided to document each audit item for easy reference and inspection. 2. An example calculation will be provided for each analysis, for each type of matrix in the data package using samples from the project. 3. Any laboratory abbreviations or notations presented in the raw data or summary information will be explained or referenced in the case narrative. 4. Final spiking concentrations will be presented in summary form. 5. Standard tracing information will be provided. 6. Cooler temperatures will be provided in the data packages. 7. Run logs will be provided in the data packages.	Not applicable	Provide missing or additional deliverables for validation purposes.
Method and QAPP requirements	The laboratory will perform the method as presented in this QAPP and will adhere to the QAPP requirements presented herein. Otherwise the laboratory will specifically note any procedures that differ from the method or the QAPP in the data package case narrative.	Not applicable	Not applicable

Note

Data validation will be performed in accordance with QA/QC criteria established in these tables and the analytical methods. Excursions from QA/QC criteria will be qualified based on guidance provided in this QAPP.

Communications with the QAO will be documented and included in the data packages.

Source: O’Brien & Gere

Table 3-4. *Metals Using USEPA Method 6010B, mercury using USEPA Methods 7470A/7471A and cyanide using USEPA Method 9012A quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Holding Times	Samples must be digested and analyzed within holding time.	Metals: 180 days from collection to analysis. Mercury: 28 days from collection to analysis. Cyanide: 14 days from collection to analysis. Metals: For TCLP preparation, 180 days from collection to TCLP extract generation and 180 days from TCLP extraction to analysis Mercury: For TCLP preparation, 28 days from collection to TCLP extract generation and 28 days from TCLP extraction to analysis.	1. If holding times are exceeded for initial or any reanalysis required due to QC excursions, notify the QA Officer since re-sampling may be required. 2. Document corrective action in the case narrative.
Initial Calibration Verification and Continuous Calibration Verification (Metals, mercury, cyanide) (ICV, CCV)	Two point calibration for ICP consisting of one standard and one blank. Five point calibration for remaining methods, with one standard at the QL level. Calibrate each time instrument is set up. After calibration, Initial calibration verification (ICV) is performed. The ICV is from a source independent of the calibration standards. For cyanide, the ICV must be distilled. A continuing calibration verification (CCV) is analyzed at the beginning of the run, at 10% or every 2 hours. Also verify at the end of each run.	ICV, CCV - 90% to 110% of expected value for ICP, AA, colorimeter, and spectrophotometer. ICV for Mercury – 90% to 110% of expected true value. CCV for Mercury - 80% to 120% of expected true value. Correlation coefficient for first or second order curve must be ≥ 0.995. For cyanide the ICV and CCV must meet 85 to 115% recovery.	1. Reanalyze. 2. If criteria are still not met, identify and correct problem, recalibrate. 3. Document corrective action in the case narrative - samples should not be analyzed until calibration control limit criteria have been met.
Contract Required Detection Limit (CRDL) Standard for ICP CRI) and AA (CRA)	1. For ICP, AA, and cyanide, CRDL is the QL concentration at the beginning of each run for all elements at the QL level 2. The CRDL shall be run for every wavelength used for analysis, except those for Al, Ba, Ca, Fe, Mg, Na, and K.	The percent recovery of the CRDL must meet the control limits of 70-130%.	1. The CRDL shall be re-analyzed immediately for those analytes; if the results of the re-analysis for those analytes fall within the control limits, no further corrective action is required. 2. If the results of the re-analysis for those analytes do not fall within the control limits, the analysis shall be terminated, the problem corrected, the instrument recalibrated, the CRDL analyzed, and the samples associated with the CRDL re-analyzed. 3. Document corrective action in case narrative.

Source: O'Brien & Gere

Table 3-4. *Metals Using USEPA Method 6010B, mercury using USEPA Methods 7470A/7471A and cyanide using USEPA Method 9012A quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Initial and Continuing Calibration Blank (ICB/CCB) (Metals, mercury, cyanide)	After ICV, CCV, at beginning and end of run and at a rate of 10% or every 2 hours during run.	The absolute value of the ICB and CCB must not exceed the QL.	1. Identify and correct problem. 2. If criteria are still not met, recalibrate and reanalyze affected samples. 3. Document corrective action in the case narrative - samples should not be analyzed until blank control limit criteria have been met.
Preparation Blank Analysis	1 per batch of samples digested, or 1 in 20, whichever is greater. PB shall be carried through the complete procedure and contain the same acid concentration in the final solution as the sample solution used for analysis.	The absolute value of the method blank must not exceed the QL.	1. Reanalyze blank. 2. If limits are still exceeded, clean instrument and recalibrate analytical system and re-preparation and reanalyze affected samples if detected. 3. Document corrective action in the case narrative - samples cannot be analyzed until blank criteria are met.
Field/Equipment Blank Analysis	Collected one per sampling event, or one per 20 samples or one per matrix (for less than 20 samples)	Less than QL	1. Investigate problem. 2. Document in the case narrative.
Laboratory Control Sample (LCS) or Matrix Spike Blank (MSB) Analysis	Every 20 samples or each digestion batch. Prepared independently from calibration standards. LCS or MSB must contain all target analytes.	Recovery within laboratory control limits. The lowest acceptable control limits for recovery will be 10%.	1. Reanalyze LCS and examine results of other QC analyses. 2. If recovery is still outside limits, and other QC criteria are met, report both runs. 3. If other QC criteria have not been met, stop analysis, locate and correct problem, recalibrate instrument and reanalyze samples since last satisfactory LCS. 4. Document corrective action in the case narrative.
Serial Dilution Analysis for ICP (Metals)	Required once per analytical batch when analyte concentration is >10 times the instrument detection limit (IDL) (or MDL if applicable). Samples from the investigation must be used for Serial dilution analysis.	An analysis of a 1:5 dilution of the sample should provide a result with 90% to 110% of the original determination (for concentrations 10x the IDL (or MDL if applicable).	1. Report results. 2. Document corrective action in the case narrative.

Table 3-4. *Metals Using USEPA Method 6010B, mercury using USEPA Methods 7470A/7471A and cyanide using USEPA Method 9012A quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Interference Check Sample Analysis for ICP (Metals)	Beginning and end of each analytical run or twice during every 8 hours, whichever is more frequent for ICP. Solution A consists of the interferents, and Solution AB consists of the analytes mixed with the interferents.	Results for the ICS Solution AB (ICSAB) during the analytical runs shall fall within the control limit of ±2 times the QL of the true value or ±20% of the true value, whichever is greater, for the analytes included in the ICSAB	1. Reanalyze. 2. If limits are still exceeded, adjust instrument. 3. Restart analytical run and reanalyze samples analyzed since last satisfactory ICS. 4. Document corrective action in the case narrative.
Matrix Spike Analysis (Metals, mercury, cyanide)	Collected one per 20 samples or one per matrix (for less than 20 samples) Samples from the investigation must be used for MS/MSD analysis.	Recovery within laboratory control limits or 75-125%, or in-house laboratory limits. Recovery does not apply if sample concentration > 4 X spike concentration. Spike must contain all analytes. The lowest acceptable laboratory control limits for recovery will be 10%.	1. Analyze post-digestion/post-distillation spike. 2. Document corrective action in the case narrative.
Post-Digestion Spike (Recommended for Metals, mercury, cyanide)	Spike must contain all target elements. Performed every 20 samples as necessary.	Recovery within 75-125% of true value.	1. Dilute sample and reanalyze. 2. If recovery is outside limits, document in the case narrative. 3. Standard additions may be used to compensate for matrix effects.
Internal standard (Metals)	May be used for each sample instead of post-digestion spike.	Internal Standard counts must be within 30% of Internal Standard counts of ICB	Reanalyze.
Laboratory Duplicate or Matrix Spike Duplicate Analysis	Collected one per 20 samples or one per matrix (for less than 20 samples) Samples from the investigation must be used for Laboratory Duplicate and MSD analysis	Laboratory control limit or 20% for RPD shall be used for original and duplicate sample values greater than or equal to five times the QL. A control limit of the QL value shall be used if either the sample or duplicate value is less than five times the CRQL.	1. Investigate problem and reanalyze. 2. Document corrective action in the case narrative.
Field Dup. Analysis	Collected 1 per matrix; every 20 samples of similar matrix. The field duplicate identification will not be provided to the laboratory.	Validation criteria: 50% RPD for waters and 100% RPD for solids. For sample results that are less than or equal to five times the QL, the criterion of plus or minus two times the QL will be applied to evaluate field duplicates.	No corrective action required of the laboratory since the laboratory will not know the identity of the field duplicate samples. If these criteria are not met, sample results will be evaluated on a case-by-case basis.
Percent solids	For soil samples, the percent solids will be determined and sample results will be corrected for percent solids.	Not applicable	Not applicable

Source: O'Brien & Gere

Table 3-4. *Metals Using USEPA Method 6010B, mercury using USEPA Methods 7470A/7471A and cyanide using USEPA Method 9012A quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Laboratory control limits	Generated with results for an analyte from a minimum of 20 sample analyses. The average of the sample results and the standard deviation are calculated. The internal warning limits are established at 2 times the standard deviation and the control limits are established at 3 times the standard deviation. The control limits are updated annually.	Not applicable	Not applicable
IDL Determination for ICP	Recommended within 30 days of the start of analysis and semiannually.	Not applicable	Not applicable
MDL Determination	Before any field samples are analyzed, the MDLs shall be determined for non-prepared analyses, each digestion procedure and instrument used, prior to the start of analyses, and annually thereafter.	Not applicable	Not Applicable
Linear Range Analysis for ICP	Every 6 months.	Not applicable	Not applicable
Interelement Correction For ICP	Within 6 months of the start of analysis and annually. Correction factors for Al, Ca, Fe, and Mg must be reported and for others if they are applied.	Not applicable	Not applicable
Sample Batching	The laboratory will batch project samples together along with QC samples specified from the project. Non-project information will not be included in the data packages.	Not applicable	Not applicable
Dilutions	1. When target analyte concentration exceed upper limit of calibration curve. 2. When matrix interference demonstrated by lab and documented in the case narrative. 3. Laboratory will note in the data deliverables which analytical runs were reported.	Not applicable	Not applicable

Source: O'Brien & Gere

Table 3-4. *Metals Using USEPA Method 6010B, mercury using USEPA Methods 7470A/7471A and cyanide using USEPA Method 9012A quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Deliverables	1. NYSDEC Category B deliverables must be provided to document each audit item for easy reference and inspection. 2. An example calculation will be provided for each analysis, for each type of matrix in the data package using samples from the project. 3. Any laboratory abbreviations or notations presented in the raw data or summary information will be explained or referenced in the case narrative. 4. Final spiking concentrations will be presented in summary form. 5. Standard tracing information will be provided. 6. Cooler temperatures will be provided in the data packages. 7. Run logs will be provided in the data packages.	Not applicable	Provide missing or additional deliverables for validation purposes.
Method and QAPP requirements	The laboratory will perform the method as presented in this QAPP and will adhere to the QAPP requirements presented herein. Otherwise the laboratory will specifically note any procedures that differ from the method or the QAPP in the data package case narrative.	Not applicable	Not applicable

Notes:
Data validation will be performed in accordance with QA/QC criteria established in these tables and the analytical methods. Excursions from QA/QC criteria will be qualified based on guidance provided in this QAPP.
Communications with O'Brien & Gere will be documented and included in the data packages.
Source: O'Brien & Gere

Table 3-5. *TOC using USEPA Method Lloyd Kahn, Ignitability using USEPA Method 1010/1020A/1030, Corrosivity using USEPA Method 9040/9045B, Reactivity using USEPA SW-846 Chapter 7 quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Holding Times	Samples must be prepared and analyzed within holding time.	1. TOC: Analyze 14 days from collection. 2. Reactivity, corrosivity, ignitability: Analyze as soon as possible.	1. If holding times are exceeded for initial or any re-analyses required due to quality control (QC) excursions, notify Quality Assurance Officer (QAO immediately since re-sampling may be required. 2. Document corrective action in the case narrative
Initial Calibration and Calibration Verification (ICV, CCV)	For TOC – Four standards and one blank covering the range of the instrument.	For TOC - 90% to 110% of expected value, or correlation coefficient for first or second order curve must be ≥ 0.995.	1. Re-calibrate. 2. If criteria are still not met, identify and correct problem, recalibrate. 3. Document corrective action - **samples cannot be analyzed until calibration control limit criteria have been met.**
Preparation Blank Analysis	For TOC - For 1 per batch of samples prepared, or 1 in 20, whichever is greater.	Less than QL.	1. Reanalyze blank. 2. If limits are still exceeded, clean instrument and recalibrate analytical system and re-preparation and reanalyze affected samples if detected. 3. Document corrective action - **samples cannot be analyzed until blank criteria are met.**
Laboratory Control Sample (LCS) or Matrix Spike Blank (MSB) Analysis	Every 20 samples or each digestion batch. Prepared independently from calibration standards. LCS or MSB must contain all target analytes.	Recovery within laboratory control limits. The lowest acceptable control limits for recovery will be 10%.	1. Reanalyze LCS and examine results of other QC analyses. 2. If recovery is still outside limits, and other QC criteria are met, report both runs. 3. If other QC criteria have not been met, stop analysis, locate and correct problem, recalibrate instrument and reanalyze samples since last satisfactory LCS. 4. Document corrective action in the case narrative.

Source: O’Brien & Gere

Table 3-5. *TOC using USEPA Method Lloyd Kahn, Ignitability using USEPA Method 1010/1020A/1030, Corrosivity using USEPA Method 9040/9045B, Reactivity using USEPA SW-846 Chapter 7 quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Matrix Spike/ Matrix Spike Duplicate (MS/MSD) Analysis	1 per group of similar concentration and matrix, 1 per case of samples, or 1 in 20, whichever is greater. Samples from the investigation must be used for MS/MSD analysis. If samples were not designated as MS/MSD samples, contact QAO upon receipt of samples at the laboratory.	Recovery within laboratory control limits or 75-125%. Recovery does not apply if sample concentration > 4 X spike concentration. Spike must contain all analytes. The lowest acceptable laboratory control limits for recovery will be 10%.	1. Analyze post-digestion/post-distillation spike at two times the PQL or two times the indigenous level, whichever is greater. For biota, a post digestion/post-distillation spike at the same concentration as the LCS will be performed. 2. Document corrective action in the case narrative.
Laboratory Duplicate or Matrix Spike Duplicate Analysis	1 per group of similar concentration and matrix, 1 per case of samples, or 1 in 20, whichever is greater.	Laboratory control limit or 20% relative percent difference (RPD) shall be used for original and duplicate sample values greater than or equal to five times the QL. A control limit of ± QL shall be used if either the sample or duplicate value is less than five times the QL.	1. Investigate problem and reanalyze. 2. Document corrective action in the case narrative.
Field / Equipment Blank Analysis	Collected one per sampling equipment and after every 20 samples.	Less than QL	1. Investigate problem. 2. Document in the case narrative.
Field Duplicate Analysis	Collected 1 per matrix; every 20 samples of similar matrix. The field duplicate identification will not be provided to the laboratory.	Validation criteria: 50% RPD for waters and 100% RPD for solids. For sample results that are less than or equal to five times the QL, the criterion of plus or minus two times the QL will be applied to evaluate field duplicates.	No corrective action required of the laboratory since the laboratory will not know the identity of the field duplicate samples. If these criteria are not met, sample results will be evaluated on a case-by-case basis.
Dilutions	1. Dilute and reanalyze samples with concentrations that are greater than the linear range of the instrument. 2. The laboratory will note in the data package which analytical runs were used to report the sample results.	Not applicable	Not applicable. .

Source: O'Brien & Gere

Table 3-5. *TOC using USEPA Method Lloyd Kahn, Ignitability using USEPA Method 1010/1020A/1030, Corrosivity using USEPA Method 9040/9045B, Reactivity using USEPA SW-846 Chapter 7 quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Laboratory control limits	1. Generated with results for an analyte from a minimum of 20 sample analyses. The average of the sample results and the standard deviation are calculated. The internal warning limits are established at 2 times the standard deviation and the control limits are established at 3 times the standard deviation. The control limits are updated annually.	Not applicable	Not applicable
Sample Batching	The laboratory will batch project samples together along with QC samples specified from the project. Non-project information will not be included in the data packages.	Not applicable	Not applicable
Percent solids	For solids samples, the percent solids will be determined and sample results will be corrected for percent solids.	Not applicable	Not applicable
Deliverables	1. NYSDEC Category B deliverables must be provided to document each audit item for easy reference and inspection. 2. An example calculation will be provided for each analysis, for each type of matrix in the data package using samples from the project. 3. Any laboratory abbreviations or notations presented in the raw data or summary information will be explained or referenced in the case narrative. 4. Final spiking concentrations will be presented in summary form. 5. Standard tracing information will be provided. 6. Cooler temperatures will be provided in the data packages. 7. Run logs will be provided in the data packages.	Not applicable	Provide missing or additional deliverables for validation purposes.

Source: O'Brien & Gere

Table 3-5. *TOC using USEPA Method Lloyd Kahn, Ignitability using USEPA Method 1010/1020A/1030, Corrosivity using USEPA Method 9040/9045B, Reactivity using USEPA SW-846 Chapter 7 quality control requirements and corrective actions*

Audit	Frequency	Control Limits	Corrective Action
Method and Quality Assurance Project Plan (QAPP) requirements	The laboratory will perform the method as presented in this QAPP and will adhere to the QAPP requirements presented herein. Otherwise the laboratory will specifically note any procedures that differ from the method or the QAPP in the data package case narrative.	Not applicable	Not applicable

Note

Data validation will be performed in accordance with QA/QC criteria established in these tables and the analytical methods. Excursions from QA/QC criteria will be qualified based on guidance provided in this QAPP.

Communications with the QAO will be documented and included in the data packages.

Source: O'Brien & Gere.

HEALTH AND SAFETY PLAN

Brownfield Cleanup Program
Remedial Investigation
SMC Brownfield Site
New Hartford, New York
Site No. C633016

Special Metals Corporation

May 2011

O'BRIEN & GERE

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1. INTRODUCTION

This Health and Safety Plan (HASP) has been developed to provide both general procedures and specific requirements to be followed by O'Brien & Gere Engineers, Inc. (O'Brien & Gere) personnel while performing Remedial Investigation (RI) activities at the Special Metals Corporation (SMC) Brownfield Site.

This HASP describes the responsibilities, training requirements, protective equipment, and standard operating procedures to be used by O’Brien & Gere personnel to address potential health and safety hazards while in investigation areas. This plan specifies procedures and equipment to be used by O'Brien & Gere personnel during work activities and emergency response to minimize exposures of O'Brien & Gere personnel to hazardous materials.

The health and safety considerations of subcontractors to O’Brien & Gere will be set forth in HASPs provided by each subcontractor. Documentation of the subcontractor’s HASP will be obtained prior to the start of the subcontractor’s work.

1.1 SMC BROWNFIELD SITE LOCATION AND DESCRIPTION

The SMC Brownfield Site is located at 4317 Middle Settlement Road in New Hartford, New York (See Figure 1 of the Work Plan). The Site is zoned industrial, and is located in a mixed-use area. The facility has been in operation at this location since 1958. Operations at the facility include melting, hot rolling, and cold finishing. Melting is performed in vacuum induction, vacuum arc, and electroslag furnaces. Adjacent property to the Site is owned by Special Metals Corporation/ Oneida County Industrial Development Agency.

1.2 IMPLEMENTATION OF HEALTH AND SAFETY PLAN

The requirements and guidelines presented in this HASP are based on a review of available information and an evaluation of potential hazards. This HASP incorporates by reference the applicable Occupational Safety and Health Administration (OSHA) requirements in 29 CFR Part 1910 and 29 CFR Part 1926. The protective equipment selection was made according to Subpart I of 29 CFR 1910. O'Brien & Gere personnel are required to read this HASP before beginning work. This HASP will be available for inspection and review by O'Brien & Gere employees while work activities are underway.

When conducting the Remedial Investigation (RI) activities listed in the Work Plan, O'Brien & Gere personnel will comply with this HASP. On-site O'Brien & Gere personnel will notify the O'Brien & Gere Site Safety and Health Coordinator (SSHC) of matters of health and safety. The SSHC is responsible to the Project Manager for monitoring activities, monitoring compliance with the provisions of this HASP, and for modifying this HASP to the extent necessary if conditions change.

This HASP is specifically intended for guiding the conduct of O’Brien & Gere activities defined in the Work Plan in the areas of the SMC Brownfield Site specified for these work activities. Although this HASP can be made available to interested persons for informational purposes, O'Brien & Gere does not assume responsibility for the interpretations or activities of any persons or entities other than employees of O'Brien & Gere.

The health and safety considerations of subcontractors to O’Brien & Gere will be set forth in HASPs provided by each subcontractor. Documentation of the subcontractor’s HASP will be obtained prior to the start of the subcontractor’s work.

1.3 PROJECT ORGANIZATION

personnel involved in the RI activities at the SMC Brownfield Site implicitly have a part in implementing the HASP. Among them, the Project Officer, the Project Manager, the Corporate Associate for Safety and Health, the SSHC, and the Site Supervisor have specifically designated responsibilities. Their names and telephone numbers are listed in Table 1-1. Other key O'Brien & Gere project personnel, the project's organization, and other primary contacts for the project are presented in the Work Plan.

Key project personnel and their responsibilities with regard to the sampling activities are discussed below.

Project Officer

Douglas M. Crawford, P.E. is the Project Officer. The Project Officer is responsible for the overall administration and technical execution of the project. The Project Officer is further responsible for the acquisition and delegation of resources necessary for project completion and HASP implementation.

Project Manager

David Carnevale, C.P.G.. is the Project Manager. The Project Manager reports to the Project Officer and is directly responsible for the technical progress and financial control of the project.

Corporate Associate for Safety and Health

Mr. Jeff Parsons, C.I.H. is the Corporate Associate for Safety and Health. Mr. Parsons will be responsible for implementation of this HASP. Procedural changes and modifications to this HASP must be approved by Mr. Parsons.

Site Safety and Health Coordinator

The O'Brien & Gere Site Safety and Health Coordinator (SSHC) for this investigation will be designated by the O'Brien & Gere Project Manager. The SSHC for O'Brien & Gere reports to the O'Brien & Gere Project Manager, coordinates his activities with the O'Brien & Gere Corporate Associate for Safety and Health, and establishes operating standards and coordinates overall project safety and health activities associated with implementation of the RI field activities. The SSHC reviews project plans and revisions to plans to determine that safety and health procedures are maintained throughout the investigation. The SSHC audits the effectiveness of the HASP on a continuing basis and suggests changes, if necessary, to the Project Manager.

Specifically, the SSHC is responsible for the conducting the following actions:

- Provide a complete copy of the HASP before the start of activities;
- Familiarize workers with the HASP;
- Conduct health and safety training and briefing sessions;
- Document the availability, use, and maintenance of personal protective and other safety or health equipment;
- Maintain safety awareness among O'Brien & Gere employees and communicating safety and health matters to them;
- Review field activities for performance in a manner consistent with O'Brien & Gere policy and this HASP;
- Monitor health and safety conditions during field activities;
- Coordinate with emergency response personnel and medical support facilities;
- Notify the Project Manager of the need to initiate corrective actions in the event of an emergency, an accident, or identification of a potentially unsafe condition;
- Notify the Project Manager of an emergency, an accident, the presence of a potentially unsafe condition, a health or safety problem encountered, or an exception to this HASP;
- Recommend improvements in safety and health measures to the Project Manager; and,
- Conduct safety and health performance and system audits.

The SSHC has the authority to recommend that the Project Manager take the following actions:

- Suspend field activities or otherwise limit exposures if the health or safety of any O'Brien & Gere employee appears to be endangered;
- Notify O'Brien & Gere personnel to alter work practices that the SSHC deems to not protect them; and,
- Suspend an O'Brien & Gere employee from field activities for violating the requirements of this HASP.

Site Supervisor

The Site Supervisor, designated by the O'Brien & Gere Project Manager, will be responsible for the implementation of sampling programs. The Site Supervisor will be responsible for overall coordination including field sampling collection and chain-of-custody. The Site Supervisor will report directly to the Project Manager or designee.

Table 1-1 Project Personnel

Name and Title	Telephone
Douglas M. Crawford, P.E. **Project Officer** **Syracuse, New York**	(315) 956-6442
David Carnevale, C.P.G. **Project Manager** **Syracuse, New York**	(315) 956-6571
Jeff Parsons, C.I.H. **Manager Corporate Health and Safety** **Syracuse, New York**	(315) 956-6871
NYSDEC Key Personnel **Peter Ouderkirk, P.E.** **Project Manager** **Region 6 – Watertown, New York**	(315) 785-2513

2. HAZARD ANALYSIS

General chemical and environmental hazards that may be encountered while implementing the RI field activities are summarized in Section 2.1. Specific health and safety considerations for field tasks detailed in the Field Activities Plan (FAP), contained in Appendix A of the RI Work Plan, are presented in separate subsections as outlined below:

- groundwater and soil boring field activities (Section 2.2)
- sediment sampling (Section 2.6)

Both the potential health and safety hazards and the hazard and contaminant control procedures for each task of the RI/FS are discussed in the sections below.

2.1 GENERAL RI FIELD ACTIVITY HAZARDS

2.1.1 Chemical Hazards

Chemical hazards that may be encountered during the RI field implementation are related to inhalation, ingestion, and skin exposure to constituents of potential concern (COPC's). COPC's may include semivolatile organic compounds (SVOCs), metals (arsenic, chromium, and nickel), and polychlorinated biphenyls (PCBs).

The potential for unprotected personnel for inhalation of constituents during intrusive RI field activities is low to moderate. The potential for unprotected personnel for dermal contact with soils, sediments or water containing COPCs during drilling and sampling operations is moderate to high. Proper use of personnel protective equipment is intended to reduce potential exposure to contaminants.

2.1.2 Potential Environmental and Physical Hazards

Prior to initiating activity, the work conditions will be discussed with all employees. Hazards will be identified and protective measures will be explained.

Environmental hazards, in addition to contaminants, include fauna and flora. Aggressive fauna, such as ticks, fleas, mosquitoes, bees, wasps, spiders and snakes may be present. Poison ivy and poison oak may also be present.

Physical Hazards involved with RI field activities are primarily associated with the work environment. The work area presents hazards of slips, trips, and falls from scattered debris and irregular walking surfaces. Weather related hazard include wet, muddy, slick, walking surfaces and unstable soil, sunburn, lightning, rain, snow, ice, and heat and cold related illnesses. There exists a potential for incidents involving personnel struck by or struck against objects resulting in fractures, cuts, punctures, or abrasions. Walking and working surfaces during activities may involve slip, trip, and fall hazards.

Materials handling and manual site preparationWork associated with the RI field activities may cause blisters, sore muscles, and joint and skeletal injuries; and may present eye, contusion and laceration hazards. A common type of accident that occurs in material handling operations is the "caught between" situation when a load is being handled and a finger or toe gets caught between two objects. Extreme care must be taken when loading and unloading material. Proper lifting technique must be employed.

Working surfaces that are slippery can increase the likelihood of back injuries, overexertion injuries, and slips and falls. All personnel should frequently inspect working surfaces and keep working surfaces clear of debris and moisture.

2.1.3 Hazard and Contaminant Control

For each field task, Level D personal protective equipment (PPE) is to be worn initially. Protective equipment will also include boots with good treads will be worn and personnel will be reminded to remain alert of the area where they are walking to decrease the chance of slipping. Eye protection will be worn to minimize splashing into eyes. The specific requirements for Level D PPE are presented in Section 4.

The primary hazards for contaminant exposure for each task are summarized on Table 2-1. If odors are observed during field activities, air monitoring with a PID should be conducted to evaluate the concentrations that are present. Action levels for upgrading PPE are presented in Section 6.2.

Field equipment will be inspected and in proper working condition. Mechanical assistance will be provided for large lifting tasks. Ground Fault Circuit Interrupter (GFCI) will be used on all electric power tools and extension cords in outdoor work locations. Electrical extension cords will be protected or guarded from damage (i.e., cuts from other machinery) and be maintained in good condition.

2.2 GROUNDWATER AND SOIL BORING ACTIVITIES

A component of field operations will consist of well and soil boring installation and sampling for groundwater and sub-surface soil samples. The physical hazards of this operation are primarily associated with operation of the drill rig and contact with potentially contaminated soil and water.

2.2.1 Potential Health Hazards and Contaminants

Hazards generally associated with well drilling operations include noise levels exceeding the OSHA PEL of 90 dBA that are both a hazard and a hindrance to communication, carbon monoxide from the drill rig, and overhead electrical and telephone wires which can be hazardous when the drill rig boom is in the upright position. Moving parts on the drill rig may catch clothing. Free or falling parts from the cat head may cause head injury. Moving the drill rig over uneven terrain may cause the vehicle to roll over or get stuck in a rut or mud. High pressure hydraulic lines and air lines used on drill rigs are hazardous when they are in disrepair or incorrectly assembled.

During the retrieval of augers, the possibility exists for splashing of exposed subsurface materials onto the workers and release of dust and volatile materials onto workers' bodies and into the workers' breathing zones.

Other hazards that may be encountered include exposure to vapors and contact with hazardous materials during monitoring well installations and ground water sampling.

2.2.2 Hazard Contaminant Control

General PPE requirements presented Section 2.1 applies to this task. Personnel must wear hard hats and ear muffs and/or earplugs when working near operating heavy machinery. Prior to approaching a drill rig, loose clothing will be secured and the boom position will be checked.

O’Brien & Gere personnel will remain upwind from the vehicle exhausts to the extent practicable unless required by sampling work. The breathing zone will be periodically monitored for volatile organic vapors using a PID during the test pit excavations and monitoring well installations. Subsequent monitoring and respirator wear will be in accordance with Chapter 6 of this HASP.

The drilling subcontractor will be required to inspect chains, lines, cables, and high-pressure lines daily for weak spots, frays, and other signs of wear. The drilling subcontractor will be required to make repairs as necessary. To avoid contact with overhead lines, the drilling subcontractor will be required to lower the drill rig boom prior to moving the rig. The drilling subcontractor will be required to verify the location of underground utilities with both the facility and the local power and utility companies prior to drilling. Overhead and underground utilities will be considered "live" until verified otherwise.

Back strain can be prevented by employing proper lifting and bailing techniques. Heavy equipment, such as pumps and generators, will only be lifted with the legs, preferably using two or three personnel.

2.3 SURFACE WATER AND SEDIMENT SAMPLING

Samples of surface water and sediments will be collected for subsequent analysis and evaluation of potential impacts. The physical hazards of this operation are primarily associated with the coring activities and sample collection methods and procedures utilized (if any).

Health and safety procedures for water related work (Section 2.8) apply to the surface water and sediment sampling tasks.

2.3.1 Potential Health Hazards and Contaminants

Surface water and sediments that are collected may contain contaminants. The potential exists for release of these materials into the atmosphere at levels that may present an inhalation hazard. The contaminants may be spread through the air and absorbed through direct contact.

Other physical hazards associated with probing/coring and sampling procedures are strains/sprains resulting from sample collection, and potential eye hazards resulting from splashes during sample collection activities.

2.3.2 Hazard and Contaminant Control

General PPE requirements and guidance for upgrading level of PPE are presented in Section 2.1 apply to this task. Control of water hazards are discussed in Section 2.8.

Chemical odors may be observed during surface water and sediment probing activities. If odors are observed, field personnel should move away to prevent exposure. Generally, odors will be observed before a PID will detect exposure. If the odors do not dissipate, subsequent monitoring will be in accordance with Section 6.2 of this HASP to evaluate the proper level of protection required.

The potential for slipping on wet surfaces will be reduced by keeping work surfaces dry to the extent practicable. Also, boots with good treads will be worn and personnel will be reminded to remain alert in the area where they are walking to decrease the chance of slipping.

2.4 WATER HAZARDS

2.4.1 Potential Health Hazards

In land-based field operations, proper training and equipment are essential to completing a project efficiently and safely. This also holds true for operations conducted on or adjacent to bodies of water. O'Brien & Gere is strongly committed to ensuring all employees conducting work adjacent to bodies of water are familiar with the hazards of water operations and the proper protective measures that must be taken to prevent injury.

2.4.2 Wading Hazard Control

Wading will be permitted if water depths are three feet or less. When wading, a personal floatation device must be worn. In unfamiliar areas, a sediment probe should be used to evaluate water depth and bed conditions before wading those areas. Bed surfaces may be slippery and uneven, proceed with caution at all times. The “buddy system” will be used if wading in water depths of 2.5 feet to 3.0 feet.

3. PERSONNEL TRAINING

3.1 FIELD WORKERS

O'Brien & Gere employees performing the activities listed in the Work Plan must have completed a training course of at least 40 hours meeting the requirements of 29 CFR 1910.120(e) for safety and health at hazardous waste operations. If the course was completed more than 12 months before the date of work, completion of an approved, 8 hour, refresher course on health and safety at hazardous waste operations is required.

3.2 MANAGEMENT AND SUPERVISORS

In addition to the requirements described in Section 3.1 for O'Brien & Gere field workers, O'Brien & Gere field supervisors performing on-site operations must have completed a training course of at least 8-hr meeting the requirements of 29 CFR 1910.120(e) on supervisor responsibilities for safety and health at hazardous waste operations.

3.3 EMERGENCY RESPONSE PERSONNEL

O'Brien & Gere employees who respond to emergency situations involving health and safety hazards must be trained in how to respond to such emergencies in accordance with the provisions of 29 CFR 1910.120(l). Skills such as cardiopulmonary resuscitation (CPR), mouth-to-mouth rescue breathing, and basic first aid skills may be necessary. Personnel who respond to emergencies on site will be briefed on potential hazards by the SSHC before being permitted to enter the buffer and exclusion zones.

3.4 PROJECT SPECIFIC TRAINING

Project-specific training will be provided to each O'Brien & Gere employee and reviewed before implementing field assignments. O'Brien & Gere personnel will be briefed daily by the Site Supervisor or by the SSHC as to the potential hazards that may be encountered during that day. Topics will include:

- Availability of this HASP;
- General hazards and specific hazards in the work areas;
- Selection, use, testing, and care of the body, eye, hand, foot and respiratory protective equipment being worn and the limitations of each;
- Emergency response procedures and requirements;
- Emergency notification procedures and evacuation routes to be followed; and,
- Procedures for obtaining emergency assistance and medical attention.

3.5 TRAINING CERTIFICATION

A record of employee training completion will be maintained by the SSHC for each O'Brien & Gere employee who is trained. This record will include the dates of the completion of worker training, supervisor training, refresher training, emergency response training, and specific training for on-site O'Brien & Gere employees.

4. PERSONNEL PROTECTION

The basic level of personal protective equipment (PPE) to be used during field activities associated with implementation of the RI is OSHA Level D. PPE may be upgraded based on air monitoring results or at the discretion of the Project Manager and based on the SSHC's recommendations. A downgrade of PPE must be approved by the SSHC and the Project Manager.

If the SSHC determines that field measurements or observations indicate that a potential exposure is greater than the protection afforded by the equipment or procedures specified in this or other sections of this HASP, the work will be stopped. O'Brien & Gere personnel will be removed from the site until the exposure has been reduced or the level of protection has been increased.

O'Brien & Gere respirator users have been trained, medically approved, and fit tested to use respiratory protection. Respirators issued are approved for protection against dust and organic vapors by the National Institute for Occupational Safety and Health (NIOSH). Respirators are issued for the exclusive use of one worker and will be cleaned and disinfected after each use by the worker. Respirator users must check the fit of the respirator before each day's use to see that it seals properly. The respirator must seal against the face so that the wearer receives air only through the air purifying cartridges attached to the respirator. No facial hair that interferes with the effectiveness of a respirator will be permitted on personnel required to wear respiratory PPE. Cartridges and filters for air-purifying respirators in use will be changed at the end of each workday that an air-purifying respirator is worn, unless the SSHC determines that a change is not necessary.

4.1 PROTECTIVE EQUIPMENT DESCRIPTION

he level of PPE is categorized as Level A, B, C, or D, based upon the degree of protection required. For each level, hard hats will be required if dangers related to overhead objects may be present. For drilling and test pitting activities, hard hats will be worn at all times. For other tasks, hard hats will be worn, as necessary. The following is a brief summary of the PPE levels that may be used on this site.

Level C - The concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air-purifying respirators are met. The following constitute Level C equipment:

- NIOSH approved full-face air purifying respirator with organic vapor/acid gases cartridges and P100 filters;
- Chemical-resistant clothing (polyethylene coated overalls, chemical-splash suit, disposable chemical-resistant overalls) with ankles and cuffs taped closed;
- Gloves, outer, nitrile, chemical-resistant;
- Gloves, inner, nitrile, chemical-resistant;
- Shoes, with steel toe and shank meeting ANSI requirements;
- Boots, outer neoprene or Chemical resistant (latex or neoprene) boot covers;
- Hearing protection, if necessary
- Hard hat, if necessary; and,
- Face shield when not wearing a full-face respirator.

Modified Level D - A work uniform providing additional skin protection when respiratory protection is not necessary. The following constitute Modified Level D equipment:

- Chemical-resistant clothing (polyethylene coated overalls, chemical-splash suit, disposable chemical-resistant overalls) with ankles and cuffs taped closed;
- Gloves, outer, nitrile, chemical-resistant;
- Gloves, inner, nitrile, chemical-resistant;
- Shoes, with steel toe and shank meeting ANSI requirements;
- Boots, outer neoprene or chemical resistant (latex or neoprene) boot covers;
- Hearing protection, if necessary
- Hard hat, if necessary;
- Escape mask (optional); and,
- Face shield when not wearing other eye protection.
- Filtering respirator (*i.e.* dust mask) voluntary use.

Level D - A work uniform affording minimal protection, used for nuisance contamination only. The following constitute Level D equipment:

- Coveralls or other appropriate work clothing;
- Shoes, with steel toe and shank meeting ANSI requirements;
- Optional chemical resistant boot covers;
- Safety glasses or chemical splash goggles;
- Gloves, nitrile if handling wet materials;
- Hearing protection, if necessary
- Hard hat, if necessary; and
- Escape mask (optional)
- Filtering respirator (*i.e.* dust mask) voluntary use.

4.2 PROTECTIVE EQUIPMENT FAILURE

If an individual experiences a failure or other alteration of PPE that may affect its protective ability, that person is to leave the work area immediately. The Project Manager or the SSHC must be notified and, after reviewing the situation, is to determine the effect of the failure on the continuation of on-going operations. If the Project Manager or the SSHC determine that the failure affects the safety of workers, the work site, or the surrounding environment, workers are to be evacuated until corrective actions have been taken. The SSHC will not allow re-entry until the equipment has been repaired or replaced and the cause of the failure has been identified.

5. MEDICAL MONITORING

5.1 MEDICAL SURVEILLANCE PROGRAM

O'Brien & Gere has implemented a medical monitoring program in accordance with 29 CFR 1910.120. The O'Brien & Gere program is designed to monitor and reduce health risks to employees potentially exposed to hazardous materials and to provide baseline medical data for each employee involved in work activities. It is also designed to determine the employee's ability to wear personal protective equipment such as chemical resistant clothing and respirators.

Medical examinations are administered on a post-employment and annual basis and as warranted by symptoms of exposure or specialized activities. The examining physician is required to make a report to O'Brien & Gere of any medical condition that would increase the employee's risk when wearing a respirator or other PPE. O'Brien & Gere maintains site personnel medical records as required by 29 CFR 1910.120 and by 29 CFR 1910.1020, as applicable.

O'Brien & Gere employees performing the activities listed in the Work Plan of this document have or will receive medical tests as regulated by 29 CFR 1910.120. Where medical requirements of 29 CFR 1910.120 overlap those of 29 CFR 1910.134, the more stringent of the two will be enforced.

5.2 RESPIRATOR CLEARANCE

Employees who wear or may wear respiratory protection have been provided respirators as required by 29 CFR 1910.134. This standard requires that an individual's ability to wear respiratory protection be medically certified before performing designated duties.

6. AIR MONITORING

Unidentified organic vapors may be present in the investigation areas. Real time monitoring of these substances may be conducted on-site by, or under the supervision of, the SSHC. The SSHC will evaluate whether the personal protective measures employed during field activities are appropriate and will modify the protective measures accordingly. The SSHC will be responsible to maintain monitoring instruments throughout the investigation.

Personal monitoring must be conducted in the breathing zone and, if workers are wearing respiratory protective equipment, outside the face piece.

6.1 FIELD INSTRUMENTATION AND SAMPLING

Field health and safety air sampling for the RI field investigation will consist of organic vapor monitoring using a PID (Section 6.1.1) according to provisions of Section 2 and Table 2-1.

6.1.1 Photoionization Detector (PID)

The air will be monitored with a portable PID equipped with a 10.2 electron volt detector to determine the presence and concentration of organic vapors before sampling, during intrusive field activities (monitoring well installations and test pit excavations). PID monitoring is conducted in the work zone.

PID monitoring will be initiated before starting sampling and, if the action levels are exceeded, continuously in the breathing zone of the worker collecting the samples.

Personnel monitoring samples will be collected in the breathing zone and, if workers are wearing respiratory protective equipment, outside the face piece. The sampling strategies may change if work tasks or operations change. Monitoring instruments will be checked for appropriate response, in accordance with the manufacturer's instructions, before use each sampling day.

Hazard Monitored: Many organic and some inorganic gases and vapors.

Application: Detects the presence and total concentration of many organic and some inorganic gases and vapors.

Detection Method: Ionizes molecules using UV radiation, produces a current that is proportional to the number of ions present.

General Care and Maintenance: Recharge daily or replace the battery. Regularly clean the lamp window. Regularly clean and maintain the instrument and its accessories. Turn the function switch to "stand-by" and allow the instrument to "warm up" for 5 min.

Typical Operating Time: 10 hours, or 5 hours with strip chart recorder.

6.2 ACTION LEVELS

Action levels presented in this section are intended primarily for the protection of workers implementing the RI activities. The action levels are used to determine when activities should stop, to determine when site evacuation is necessary, to select emergency response levels, and to change PPE levels.

6.2.1 Organic Vapors

Organic vapors may be released during intrusive activities such as soil boring, well and test pit installation. A PID will be used to determine the presence of organic vapors.

The breathing zone will be monitored continuously when VOC levels in the sampling zone exceeds 5 ppm above background. Actions, such as keeping the sampling upwind of motors and fuel areas will be implemented to reduce potential interference due to vapors that may be associated with motor operation.

PPE will upgraded to Level C which includes air purifying respirators and chemical resistant clothing (Section 4) when the VOC concentration in the respective breathing zone exceeds 5 ppm above background as indicated on the PID. If the measured VOC concentration is greater than or equal to 50 ppm above background, the workers will leave that work area.

Table 6-1 VAPOR MONITORING REQUIREMENTS

Total VOC Concentration (ppm)	Method	Monitoring Zone	Monitoring Requirements	Level of PPE
<5	PID	Work Zone	Periodically in the work zone at minimum 30-minute intervals	Level D
>5	PID	Work Zone	Continually in the work zone	Level C
>50	PID	Work Zone	Vacate area	Vacate area

6.3 COMMUNITY AIR MONITORING PLAN

This section serves as the Community Air Monitoring Plan (CAMP). Monitoring described in this CAMP will be implemented during invasive RI field activities, which will include soil boring and test pit advancements for the purpose of collecting subsurface soil samples and those for the installation of monitoring wells.

The upwind and downwind perimeter of the exclusion zone will be monitored during intrusive work. A PID will monitor total organic vapors while a particulate meter will monitor particulate concentrations. The monitors will be equipped with audible and visual alarms, have recorders and display 15 minute time weighted averages. All readings will be downloaded and available for New York State Department of Health (NYSDOH) and NYSDEC personnel to review. Action levels for organic vapors and particulate emissions are outlined in the following subsections as well as on Table 6-2.

6.3.1 Organic Vapors

If the 15-minute average VOC level remains below 5 ppm above background, intrusive work activities may continue. If the 15-minute average VOCs level exceeds 5 ppm above background, intrusive work activities will be suspended. Monitoring will continue under the provisions of the Vapor Emission Response Plan described below. If the 15-minute average VOCs level exceeds 25 ppm above background, intrusive work will be stopped and the Major Vapor Emissions Plan described below will be activated. Monitoring will continue under the provisions of the Major Vapor Emission Plan described below.

Vapor emission response plan.

If the vapor levels increase above 5 ppm above background at the downwind perimeter of the exclusion zone but remain below 25 ppm above background, work can resume provided:

- The source of the vapors has been identified and corrective actions have been taken to abate the emissions. These actions must reduce the exclusion zone perimeter emissions below 5 ppm.
- The organic vapor level 200 feet downwind of the work area or half of the distance to the nearest residential or commercial structure, whichever is less, is less than 5 ppm over background. If the distance to the nearest occupied building is less than 20 feet, the monitor will be placed at the perimeter of the work area.
- Continuous monitoring continues.

Major vapor emission plan.

If organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half of the distance to the nearest residential or commercial property, whichever is less, all work activities at the site will be halted.

If, following the cessation of the work activities, the downwind organic levels persist above 5 ppm above background, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20-Foot Zone).

If efforts to abate the emission source are unsuccessful and if organic vapors persist at levels_≥5 ppm for more than 30 minutes or any level ≥10 ppm in the 20-foot Zone, then the following actions will be taken:

1. Monitoring will be conducted continuously in the “20 foot zone” until VOC levels are below 5 ppm. All intrusive site activities will be halted during this time.
2. The site owner will be notified.
3. The NYSDEC will be notified.

6.3.2 Dust/Particles

When the 15-minute average dust level remains below 0.1 milligrams per cubic meter (mg/m^3) above background, intrusive work activities may continue.

If the downwind PM-10 particulate level is 0.1 mg/m^3 greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed.

If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 0.15 mg/m3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 0.15 mg/m3 of the upwind level and in preventing visible dust migration.

Particulate emission response plan.

If the particulate levels increase above 0.1 mg/m^3 over background at the downwind perimeter of the exclusion zone but remain below 0.15 mg/m^3 above background, work can resume provided dust suppression techniques are employed and no visible dust is migrating from the work area.

If the particulate levels increase above 0.15 mg/m^3 over background at the downwind perimeter of the exclusion zone, work can resume provided dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

Table 6-2 COMMUNITY AIR MONITORING PLAN (CAMP) ACTION LEVELS

Contaminant (equipment/method)	Frequency	Downwind Action Levels*	SSHC Action/Response
Volatile Organic Vapors **Odor observations and PID (PID with 11.7 eV lamp)**	1. Continuously downwind during invasive work activities. 2. When observations of any unusual odors are reported to the SSHC.	<5 ppm (at the exclusion zone perimeter)	1. Work may continue. 2. Readings shall be recorded and made available for NYSDEC/NYSDOH review.
		5 ppm (at the exclusion zone perimeter)	1. STOP work. 2. Move to a location 200' downwind or at half the distance between the exclusion zone and nearest dwelling (but not closer than 20') and continue air monitoring and recording readings at this location. If the VOC level at the downwind location is <5 ppm, return to the exclusion zone perimeter and take additional VOC readings. 3. Work may continue if exclusion zone perimeter readings are <5 ppm and additional vapor controls have been implemented. 4. Monitoring must continue at the exclusion zone perimeter for a s long as VOC levels are ≥5 ppm.
		25 ppm (at the exclusion zone perimeter)	1. STOP work. 2. Implement additional vapor emission controls to reduce VOC levels below 5 ppm (at the exclusion zone perimeter) 3. Notify the O'Brien & Gere Project Manager and SMC representative.
Dust **Observations and Dust Meter (Dust Trak or MiniRam)**	1. Continuously downwind during invasive work activities. 2. When observations of any unusual odors are reported to the SSHC.	<0.1 mg/m^3 (at the exclusion zone perimeter)	1. Work may continue. 2. Readings shall be recorded and made available for NYSDEC/NYSDOH review.
		0.1 – 0.15 mg/m^3 (at the exclusion zone perimeter)	1. Work may continue but use dust suppression controls.
		>0.15 mg/m^3 (at the exclusion zone perimeter)	1. STOP work. 2. Work may continue if exclusion zone dust readings are <0.15 mg/m^3 and additional dust controls have been implemented. 3. Immediately notify the O'Brien & Gere Project Manager, O'Brien & Gere Manager of Corporate Health and Safety, and SMC representative. 4. Work will not restart until the cause of the elevated dust levels has been evaluated and corrective action identified.

* Sustained readings for 1-minute above background. Background readings are taken at upwind locations relative to exclusion zones.

7. SITE CONTROL

7.1 SITE SEQURITY

Site security will be monitored and controlled by the Project Manager, the Site Supervisor, and the SSHC. Their duties will include limiting access to the work area to authorized personnel, overseeing project equipment and materials, and overseeing work activities. The procedures specified below will be followed to control access to each work site to prevent persons who may be unaware of site conditions from exposure to hazards. Work area control procedures may be modified as required by site conditions.

7.2 SITE CONTROL

Work zones will be required during site activities identified in this HASP. The following two categories of work zones will be established at each sampling point: an exclusion zone and a buffer zone. The remainder of the site will be the support zone.

7.2.1 Exclusion Zone

The exclusion zone is where sampling activities are conducted. The SSHC will identify this zone. It must be at least 30 ft in diameter and centered on the work activities.

7.2.2 Buffer Zone

The buffer zone contains personnel and equipment decontamination stations and staging areas for samples. The buffer zone will be located upwind of the work activities. It will only be large enough to contain equipment and personnel necessary to keep potentially contaminated media and materials in the immediate work area.

7.2.3 Support Zone

The remainder of the area is defined as the support zone. The support zone contains support facilities, extra equipment, transport vehicles, and additional personnel and equipment necessary to manage and perform work activities.

7.3 SITE ACCESS PROCEDURES

Access during field activities will be limited to those personnel required. Such personnel are anticipated to include, but will not necessarily be limited to, O’Brien & Gere employees or subcontractors and those representatives as designated by the NYSDEC or local agencies. Site access will be monitored by the SSHC, who will maintain a log-in sheet. The log will include O’Brien & Gere and other personnel on the site, their arrival and departure times and their destination on the site.

7.4 SITE COMMUNICATIONS

A cellular telephone will be used during activities to facilitate communications for emergency response and other purposes and to serve as the primary off-site communication network.

7.5 CONFINED SPACE ENTRY

No entry of permit required confined spaces is expected while O'Brien & Gere personnel perform the tasks listed in the FAP. A confined space is defined as a space that has limited or restricted means for entry (for example tanks, vessels, silos, storage bins, hoppers, vaults, and pits), is not designed for continuous employee occupancy, and large enough to enter.

8. DECONTAMINATION

8.1 PERSONNEL DECONTAMINATION PROCEDURES

The SSHC will be responsible for supervising the proper use and decontamination of PPE. The SSHC will also establish and monitor the decontamination line.

Decontamination involves scrubbing with a soap and water solution followed by rinses with potable water. Decontamination will take place on a decontamination pad. Dirt, oil, grease, or other foreign materials that are visible will be removed from surfaces. Scrubbing with a brush may be required to remove materials that adhere to the surfaces. Splash protection garments will be washed with soap and potable water before removal. Non-disposable garments will be air dried before storage. Waste waters from personnel decontamination will be disposed of with the waste waters from equipment decontamination. Respirators will be sanitized as well as decontaminated each day before re-use. The manufacturer's instructions will be followed to sanitize the respirator masks.

The following decontamination protocol, or one providing the same level of decontamination, will be followed:

Station 1: Equipment Drop

Provide an area covered with a plastic drop cloth. Deposit equipment used on-site including tools, sampling devices and containers, monitoring instruments, radios and clipboards on the plastic drop cloth. During hot weather a cool down station with chairs, fans, and replenishing beverages may be set up in this area.

Station 2: Outer Garment, Boots, and Gloves Wash and Rinse

Establish a wash station for gloves, boots, and the protective suit (when worn). Scrub outer boots, outer gloves, and protective suit with detergent and water. Rinse with potable water.

Station 3a: Outer Boot and Glove Removal

Provide seating for use during the removal and collection of outer boots. Remove outer boots. Deposit them in a container with a plastic liner. If the boots are to be reused after cleaning, place them in a secure location near the work site. Provide a location for removal, collection, and disposal of outer gloves. Remove the outer gloves. Deposit them in a container for disposal.

Station 3b: Filter or Cartridge Exchange

This station will be established only if respirators are worn. The worker's respirator cartridges and filters can be exchanged, new outer gloves and outer boots donned, and joints taped at this station. From here the worker can return to work duties in the exclusion zone.

Station 4: Outer Garment Removal

This station will only be provided if a protective outer garment is worn. Provide a bench to sit on during the removal of the protective garment. If the garment is disposable, deposit it in a container with a plastic liner; otherwise, hang it up to air dry.

Station 5: Respirator Removal

This station will be established only if respirators are worn. Remove the respirator. Avoid touching the face with gloved fingers. Deposit the respirator on a plastic sheet.

Station 6: Inner Glove Removal

Remove and dispose of inner gloves. Deposit them in a container with a plastic liner. If the gloves are to be reused, place them in a secure location near the work site, preferably in a plastic container.

Station 7: Field Wash

Provide a place for a field wash. Wash hands and face thoroughly. Shower if body contamination is suspected.

8.2 EMERGENCY DECONTAMINATION PROCEDURES

Although no contact with chemicals that present a hazard is anticipated for the field program, this section has been included in the event of an emergency. The extent of emergency decontamination depends on the severity of the injury or illness and the nature of the contamination. Minimum decontamination will consist of detergent washing, rinsing and removal of contaminated outer clothing and equipment. If time does not permit the completion of all of these actions, it is acceptable to remove the contaminated clothing without washing it. If the situation is such that the contaminated clothing cannot be removed, the person should be given required first aid treatment, and then wrapped in plastic or a blanket prior to transport to medical care. If heat stress is a factor in the victim's illness/injury, outer clothing will be removed from the victim immediately.

8.3 MONITORING EQUIPMENT DECONTAMINATION PROCEDURES

Sampling equipment used for health monitoring purposes will be cleaned of visible contamination and debris before initial use on site, between uses, and after final use. Monitoring equipment that contacts contaminated media will be decontaminated after each use by a low phosphate detergent brushing followed by a clean water rinse. After decontamination, monitoring equipment will be stored separately from personal protective equipment. Decontaminated or clean equipment not in use will be covered with plastic and stored in a designated storage area in the support zone.

8.4 DECONTAMINATION SUPPLIES

The following supplies will be available on site for the decontamination of personnel and equipment:

- Plastic drop cloths;
- Plastic bags or DOT-approved fiberboard drums to collect non-reusable protective clothing;
- Plastic wash tubs;
- Soft bristled long-handle brushes;
- DOT-approved drums or appropriate other containers, to collect wash and rinse water;
- Hand spray units for decontamination;
- Soap, water, alcohol wipes, and towels to wash hands, faces, and respirators; and,
- Washable tables and benches or chairs.

8.5 COLLECTION AND DISPOSITION OF CONTAMINATED MATERIALS

Cuttings and field decontamination wastes are to be collected, drummed, and disposed of in accordance with the procedures in the FAP. Investigation derived waste will be managed as described in the FAP.

8.6 REFUSE DISPOSAL

Site refuse will be contained in appropriate areas or facilities. Trash from the project will be properly disposed.

9. EMERGENCY RESPONSE

9.1 NOTIFICATION OF SITE EMERGENCIES

In an emergency, site personnel will signal distress either by yelling or with three blasts from a horn (vehicle horn, air horn and so forth). The SSHC, Site Supervisor, or the Project Manager will immediately be notified of the nature and extent of the emergency.

Directions to St. Luke's Emergency Department from the site are provided below:

- Exit SMC facility
- Turn left onto Middle Settlement Road heading north toward NY-5 east/Seneca Turnpike – 1 mile
- Slight right at NY-5 East/Seneca Turnpike toward French Road exit – 2.9 miles
- Take French Road exit toward St. Luke's Hospital – 0.3 miles
- Turn right at French Road and continue onto Champlin Avenue – 0.3 miles
- Make U-turn, St. Luke's Hospital will be on right.

A map of the route to St. Luke's Hospital from the Site is provided as Figure 1.

Should someone be transported to a hospital or doctor, a copy of this HASP should accompany them.

The following table contains emergency telephone numbers. This table will be kept with the portable telephone and updated as needed by the SSHC. The portable telephone will be used to notify off-site personnel of emergencies. The operating condition of this telephone will be determined daily before initiation of activities.

Table 9-1 EMERGENCY CONTACT NUMBERS

AGENCY	CONTACT/FUNCTION	PHONE NUMBER
New Hartford Police Dept.	Report Incidents	911
NYS Police	Report Incidents	911 or 1-800-342-4357
Oneida County Sheriff	Report Incidents	911
New Hartford Fire Dept.	Report Fire	911
St. Luke's Hospital	Emergency Dept.	315-624-6112
NYSDEC Project Contact	Peter Ouderkirk	315-785-2513
Poison Control Center		1-800-222-1222

9.2 RESPONSIBILITIES

The SSHC is responsible for responding to, or coordinating the response of off-site personnel to, emergencies. In the event of an emergency, the SSHC will direct notification and response, and will assist the Site Supervisor in arranging follow-up actions. Upon notification of an exposure incident, the SSHC will call the hospital, fire, and police emergency response personnel for recommended medical diagnosis, treatment if necessary, and transportation to the hospital.

Before the start of investigation activities, the SSHC will:

- Confirm that the following safety equipment is available: eyewash station, first aid supplies, and a fire extinguisher
- Have a working knowledge of the O'Brien & Gere safety equipment.
- Confirm the most direct route to Faxton-St. Luke's Healthcare is prominently posted with the emergency telephone numbers.
- Confirm that employees who will respond to emergencies have been appropriately trained.

Before work may resume following an emergency, used emergency equipment must be recharged, refilled, or replaced and government agencies must be notified as required.

The Project Manager, assisted by the SSHC and the Site Supervisor, must investigate the incident as soon as possible. The Project Manager will determine whether and to what extent exposure actually occurred, the cause of exposure, and the means to prevent similar incidents. The resulting report must be signed and dated by the Project Manager, the SSHC, and the Site Supervisor.

9.3 ACCIDENTS AND INJURIES

In the event of an accident or injury, workers will immediately implement emergency isolation measures to assist those who have been injured or exposed and to protect others from hazards. Upon notification of an exposure incident, the SSHC will contact emergency response personnel who can provide medical diagnosis and treatment. If necessary, immediate medical care will be provided by personnel trained in first aid procedures. Other on-site medical or first aid response to an injury or illness will be provided only by personnel competent in such matters. In addition, the O'Brien & Gere Corporate Associate for Safety and Health will be notified within 24-hours of an accident involving O'Brien & Gere personnel and/or its subcontractors.

9.4 SAFE REFUGE

Before commencing site activities the SSHC will identify the location that will serve as the place of refuge for O'Brien & Gere workers in case of an emergency evacuation. During an emergency evacuation, personnel in the exclusion zone should evacuate the work area both for their own safety and to prevent hampering rescue efforts. Following an evacuation, the SSHC will account for site personnel.

9.5 FIRE FIGHTING PROCEDURES

A fire extinguisher meeting the requirements of 29 CFR Part 1910 Subpart L, as a minimum, will be available in the support zone during on-site activities. This is intended to control small fires. When a fire cannot be controlled with the extinguisher, the exclusion zone will be evacuated, and the fire department will be contacted immediately. The SSHC or the Site Supervisor will determine when to contact the fire department.

9.6 EMERGENCY EQUIPMENT

The following equipment, selected based on potential site hazards, will be maintained in the support zone for safety and emergency response purposes:

- Fire extinguisher;
- First aid kit; and,
- Eye wash bottles.

9.7 EMERGENCY SITE COMMUNICATIONS

Hand and verbal signals will be used at the site. Portable telephones will be available during site activities for emergency response communications.

9.8 SECURITY AND CONTROL

Work zone security and control during emergencies, accidents, and incidents will be monitored by the SSHC or the Site Supervisor. The duties of the SSHC or the Site Supervisor include limiting access to the work zones to authorized personnel and overseeing emergency response activities.

10. SPECIAL PRECAUTIONS AND PROCEDURES

The activities listed in the Work Plan may expose personnel to both chemical and physical hazards. The hazards associated with specific site activities are discussed in Section 2. The potential for exposure to hazardous situations will be significantly reduced through the use of air monitoring, PPE, hazard awareness training, and administrative and engineering controls. Other general hazards that may be present on a hazardous waste work site are discussed below.

10.1 HEAT STRESS

The timing and location of this project may be such that heat stress could pose a threat to the health and safety of site personnel. The SSHC will implement work and rest regimens so that O'Brien & Gere Engineers personnel do not suffer adverse effects from heat. These regimens will be developed by the SSHC following the guidelines in the 1997 edition of the ACGIH Threshold Limit Values for Physical Agents in the Work Environment. Special clothing and an appropriate diet and fluid intake will be recommended to O'Brien & Gere Engineers personnel involved in the activities specified in Section 2 to further reduce this hazard. In addition, ice and fluids will be provided as appropriate in the support zone.

10.2 COLD INJURY

The project requires work over water and thus the timing and location of this project may be such that cold injury could pose a threat to the health and safety of site personnel. Factors that influence the development of a cold related injury include ambient temperatures, wind velocity and wet clothing and skin. The SSHC will implement work and rest regimens so that O'Brien & Gere Engineers personnel do not suffer adverse effects from cold. These regimens will be developed by the SSHC following the guidelines in the 1997 edition of the ACGIH Threshold Limit Values for Physical Agents in the Work Environment. Special clothing and an appropriate diet and fluid intake will be recommended to O'Brien & Gere Engineers personnel involved in the activities specified in Section 2 to further reduce this hazard. In addition, ice and fluids will be provided as appropriate in the support zone.

10.3 HEAVY EQUIPMENT / MACHINERY

O'Brien & Gere employees performing site activities may use or work near operating heavy equipment and machinery. Respiratory protection and protective eyewear may be worn during portions of work activities. Since this protective equipment reduces peripheral vision of the wearer, O'Brien & Gere Engineers personnel should exercise extreme caution in the vicinity of operating equipment and machinery to avoid physical injury to themselves or others.

10.4 ADDITIONAL SAFETY PRACTICES

The following are important safety precautions that will be enforced during the completion of the activities listed in Section 2:

- Contact with potentially contaminated surfaces should be avoided whenever possible. Workers should minimize walking through puddles, mud, or other discolored surfaces; kneeling on ground; and leaning, sitting, or placing equipment on drums, containers, vehicles, or the ground.
- Medicine and alcohol can mask the effects of exposure to certain compounds. Consumption of prescribed drugs must be at the direction of a physician.
- O'Brien & Gere Engineers personnel and equipment in the work areas will be minimized consistent with effective site operations.
- Unsafe or inoperable equipment left unattended will be identified by a "DANGER, DO NOT OPERATE" tag.
- Activities in the exclusion zone will be conducted using the "Buddy System." The Buddy is another worker fully dressed in the appropriate personal protective equipment who can perform the following activities:
- Provide partner with assistance
- Observe partner for sign of chemical or heat exposure
- Periodically check the integrity of partner's PPE
- Notify others if emergency help is needed.
- The HASP will be reviewed frequently for its applicability to the current and upcoming operations and activities.

10.5 DAILY LOG CONTENTS

The Project Manager and the SSHC will establish a system appropriate to the SMC Brownfield Site investigation areas that will record, at a minimum, the following information:

- The O'Brien & Gere Engineers personnel and other personnel conducting the site activities, their arrival and departure times, and their destination at the investigation areas
- Incidents and unusual activities that occur on the site such as, but not limited to, accidents, breaches of security, injuries, equipment failures and weather related problems
- Changes to the Work Plan and the HASP
- Daily Information such as:
    - Work accomplished and the current site status
    - Air monitoring results

Directions to 1656 Champlin Ave, Utica, NY 13413
4.9 mi – about **10 mins**

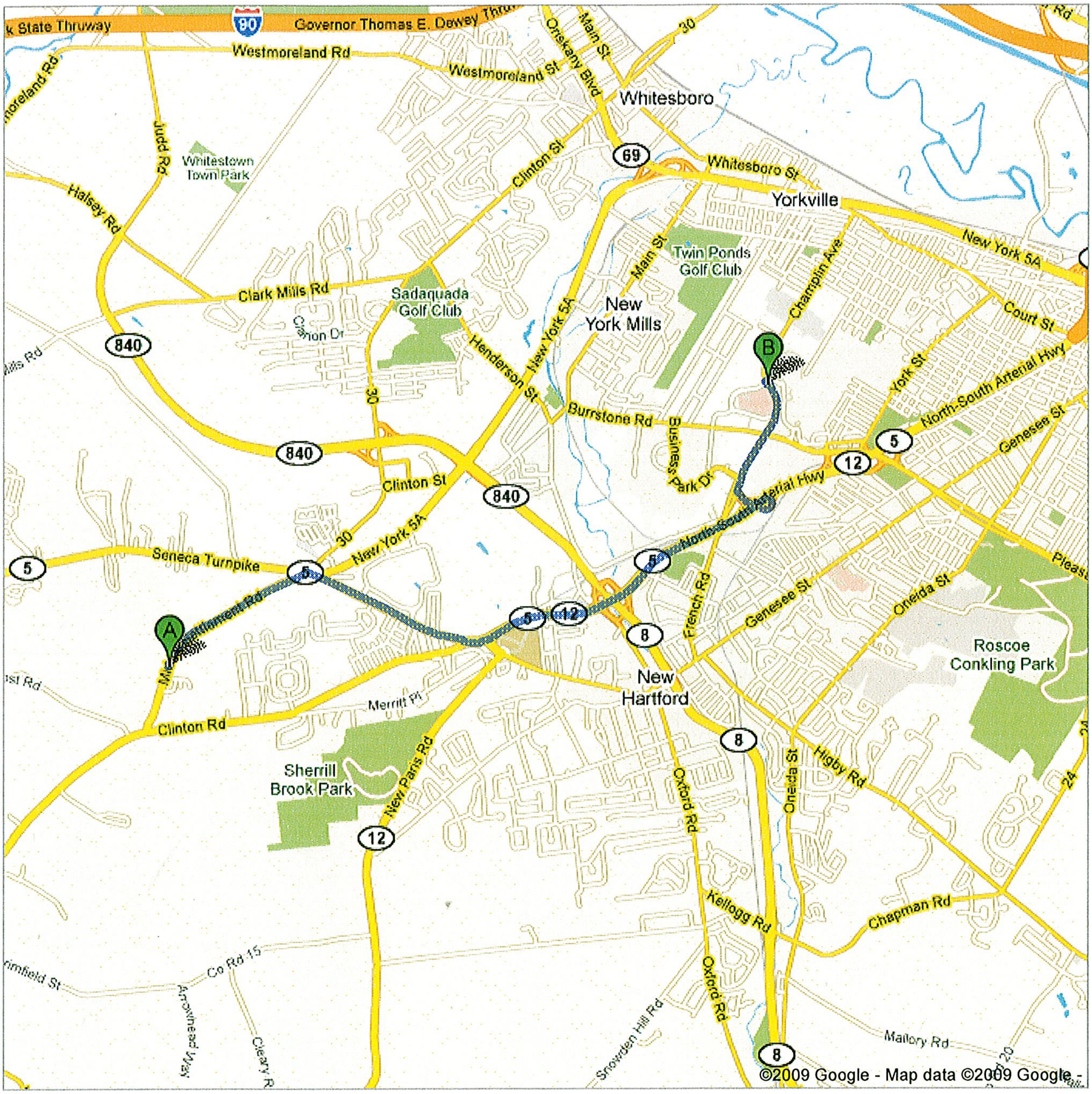


Figure 1 - Route to St. Luke's Hospital from SMC Brownfield Site

Attachment 1 – Former Surface Impoundment / SWMU Monitoring Report – Fall 2010

December 20, 2010

Mr. Peter S. Ouderkirk, P.E.
Project Manager/Engineer
NYSDEC – Region 6
Division of Environmental Remediation
317 Washington Street
Watertown, New York 13601-3787

RE: Special Metals Corporation
New Hartford, New York
Former Surface Impoundment/SWMU
October 2010 Monitoring Report

FILE: 2290/44544

Dear Peter:

The following letter report presents the results of the semi-annual groundwater monitoring event conducted on October 18, 2010 at the Former Surface Impoundment area at the Special Metals Corporation (SMC) facility in New Hartford, New York.

FIELD ACTIVITIES AND RESULTS

Figure 1 depicts the location of each of the on-site monitoring wells. Wells 86-1 (former recovery well), 86-2, 86-3, and 86-4 monitor groundwater within the glacial till, and wells 86-5, 86-6, and 83-4 monitor groundwater in the sand and gravel zone. A tabular summary of the groundwater monitoring program requirements for the years 2009 through 2012 is provided as Attachment 1.

Groundwater and surface water level monitoring

Groundwater level measurements were obtained by O'Brien & Gere Engineers, Inc. (O'Brien & Gere) on October 18, 2010 from compliance monitoring wells 86-3, 86-4, and 86-5, in accordance with the monitoring schedule (Attachment 1). These elevations are presented in Table 1.

Groundwater sampling and analyses

Consistent with prior monitoring events, O'Brien & Gere conducted low-flow groundwater sampling at the compliance wells on October 18, 2010. Low flow groundwater sampling logs are provided in Attachment 2. The stabilized pH and specific conductivity measurements from the low-flow sampling events, along with historical pH and specific conductivity data from these wells, are summarized on Table 2.

Groundwater samples were collected and submitted to Life Science Laboratories, Inc. in Syracuse, New York following chain-of-custody procedures. The samples were analyzed for total nickel by USEPA Method 200.7, and quality assurance/quality control (QA/QC) deliverables were provided in accordance with the New York State Department of Environmental Conservation's (NYSDEC's) Analytical Services Protocol.

Nickel concentrations in the monitoring well samples were tabulated and compared to the New York State Class GA groundwater quality standard for nickel of 0.10 mg/L. The groundwater analytical data are summarized on Table 3, and the laboratory analytical data summaries for the sampling events are included in Attachment 3.

The raw analytical nickel data and the two-year moving averages for wells 86-3, 86-4, and 86-5 are summarized on Table 4 and illustrated graphically on Figures 2, 3, and 4, respectively. For comparison purposes, the 0.10 mg/L groundwater standard for nickel is also shown on each figure.

As shown and illustrated, nickel concentrations remained below the New York State Class GA groundwater quality standard of 0.10 mg/L at well 86-3, and decreased slightly at wells 86-4 and 86-5 compared to the April 2010 sampling results.

RECOMMENDATIONS

It is recommended that the semi-annual low-flow purging and sampling be continued to provide data to further support the groundwater monitoring program.

FUTURE SITE ACTIVITIES

As shown in Attachment 1, the next semi-annual sampling is scheduled for the Spring of 2011. That event, currently scheduled for April, will include the collection of water levels and groundwater samples from compliance wells 86-3, 86-4, and 86-5.

If you should have any questions or comments regarding this report, please feel free to contact me at (315) 956-6492.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

Mark W. Weeks

Mark W. Weeks, P.E.
Senior Manager

I:\Special-Metals.2290\44544.Surface-Impound\Docs\Reports\October 2010\Surf Imp_Report_Fall2010_Final_12.20.10.doc

Attachments

Cc: J. Mack – Special Metals
D. Carnevale, C.P.G. – O'Brien & Gere

List of Tables, Figures, and Attachments

Tables

Figures

Attachments

TABLE 1

SPECIAL METALS CORPORATION
FORMER SURFACE IMPOUNDMENT AREA

GROUNDWATER ELEVATION DATA

	MONITORING WELL(1)								MUD
DATE	**81-2**	**83-4**	**86-1**	**86-2**	**86-3**	**86-4**	**86-5**	**86-6**	**94-1(3)**	**CREEK(5)**
T.O.C.(2)	529.58	526.52	527.46	527.28	525.34	527.96	525.18	527.30	530.15	519.61
Jun-91	---	515.95	---	516.74	514.82	516.00	516.44	517.72	---	---
Sep-91	---	516.06	---	517.71	516.12	515.94	516.27	518.17	---	---
Dec-91	---	517.63	---	518.64	517.30	517.47	517.36	519.36	---	---
Mar-92	---	517.76	---	518.92	517.38	517.55	517.48	519.41	---	---
Aug-92	---	519.22	---	522.62	517.36	518.60	516.51	520.30	---	---
Apr-93	521.14	520.16	517.42	521.09	517.99	519.86	518.16	521.60	---	---
Sep-93	521.52	516.78	519.94	517.86	516.65	516.66	516.75	518.39	---	---
Mar-94	522.45	520.24	---	520.85	518.62	519.89	518.80	521.71	---	---
Sep-94	519.55	514.59	518.22	515.68	514.94	514.56	515.02	516.46	521.18	---
Mar-95	521.57	517.96	520.17	519.50	517.40	517.69	517.50	519.62	523.13	---
Sep-95	520.91	515.34	519.53	517.33	515.74	515.30	515.83	517.88	522.61	---
Mar-96	521.65	517.66	519.98	518.91	517.30	517.38	517.41	519.48	523.06	---
Sep-96	520.50	515.88	519.29	517.29	516.04	515.86	516.20	517.82	522.81	---
Mar-97	521.49	518.45	520.22	519.31	517.27	517.95	517.39	519.86	523.16	---
Sep-97	520.79	515.29	519.38	517.05	515.81	515.30	515.89	517.54	522.67	---
Feb-98	521.48	518.27	520.42	518.84	517.47	517.83	517.63	519.40	523.05	---
Apr-99	521.06	517.56	519.95	518.59	517.05	517.35	517.15	519.13	523.10	---
Sep-99	---		---	---	516.61	517.95	516.81	---	---	---
Apr-00	521.51	519.40	520.76	---	517.64	519.11	517.76	520.70	523.53	---
Sep-00	---		---	---	516.58	517.66	516.65	---	---	514.59
May-01	---		---	---	516.55	516.55	516.49	---	---	---
Nov-01	520.55	516.02	518.76	517.26	516.29	515.92	516.17	517.28	522.73	514.57
May-02	521.08	518.75	520.10	519.91	517.42	518.36	517.31	519.63	523.42	515.00
Oct-02	---	---	---	---	517.19	518.02	516.99	---	---	---
Apr-03	---	---	---	---	517.08	517.38	516.96	---	---	---
Sep-03	---	---	---	---	---	---	---	---	---	---
Jul-04	521.11	520.32	519.52	520.00	518.94	519.53	518.89	520.01	523.12	513.41
Oct-04	---	---	---	---	---	---	---	---	---	---
Jun-05	---		---	---	517.87	516.46	517.77	---	---	---
Oct-05	521.57	519.73	521.17	520.64	519.05	519.30	518.89	520.65	523.44	513.19
Apr-06	520.87	517.74	519.29	518.75	518.00	517.37	518.13	518.78	523.00	512.38
Dec-06	---		---	---	517.86	517.69	517.73	---	---	---
Mar-07	---		---	---	518.96	519.73	518.88	---	---	---
Oct-07	521.36	518.02	519.57	519.31	517.05	517.55	516.83	519.27	---	511.19
Apr-08	---	---	---	---	---	---	---	---	---	---
Oct-08	521.63	516.57	519.01	517.57	516.50	516.00	516.27	517.60	---	512.71
May-09	---	---	---	---	516.59	516.19	516.29	---	---	---
Oct-09	521.71	517.18	519.21	518.48	516.74	516.84	516.52	518.43	523.28	512.67
Apr-10	521.15	517.34	519.18	518.43	516.84	517.01	516.72	518.45	523.25	512.76
Oct-10	---	---	---	---	517.30	517.96	517.05	---	---	---

Notes:
(1) Wells 86-1, 86-2, 86-3, and 86-4 are screened in glacial till.
(2) Top of casing elevations based on CT Male October 2008 survey relative to NAVD 88
(3) Well 94-1 installed in January 1994. No top of casing elevation obtained at time of March 1994 sampling.
(4) "--" Groundwater elevation not recorded.
(5) Mud Creek gauging station is concrete bridge abutment south of guard house

TABLE 2

SPECIAL METALS CORPORATION
FORMER SURFACE IMPOUNDMENT AREA

GROUNDWATER MONITORING DATA

	pH (S.U.)					Specific Conductivity (mho/cm)				
Date	**83-4**	**86-1**	**86-3**	**86-4**	**86-5**	**83-4**	**86-1**	**86-3**	**86-4**	**86-5**
Jun-91	7.40	6.90	7.10	6.70	6.60	780	4,100	640	3,600	1,700
Sep-91	7.20	-	7.70	7.10	6.60	573	-	748	2,090	1,665
Dec-91	7.30	7.50	7.40	6.90	6.90	880	2,000	480	4,400	1,600
Mar-92	7.00	-	7.40	6.70	7.20	490	-	630	1,300	1,000
Aug-92	7.20	7.20	7.50	6.80	7.00	800	4,500	650	3,200	1,500
Apr-93	7.00	6.40	6.50	6.20	6.40	780	1,500	2,500	4,600	1,200
Sep-93	6.40	7.00	6.50	6.40	6.80	800	5,400	670	320	1,000
Mar-94	8.00	7.20	7.60	7.10	7.10	480	2,800	800	3,100	1,000
Sep-94	7.40	7.10	7.20	7.00	6.80	1,000	3,400	680	3,800	1,400
Mar-95	7.40	6.00	7.20	6.40	7.00	850	6,100	600	4,200	1,400
Sep-95	7.20	7.00	6.90	7.10	6.90	800	4,600	820	3,400	1,300
Mar-96	7.20	6.70	6.60	6.60	6.50	760	5,200	540	4,000	1,400
Sep-96	6.50	7.40	7.60	6.80	7.10	860	6,000	580	3,700	1,600
Mar-97	7.60	6.80	7.10	7.20	6.80	660	5,800	510	3,800	1,200
Sep-97	6.80	6.80	7.10	6.90	6.60	650	4,200	450	6,400	1,250
Feb-98	7.00	6.20	6.60	6.10	6.20	560	3,400	460	3,100	1,200
Aug-98	7.00	-	7.00	6.50	6.50	660	-	472	2,310	320
Sep-98	6.60	-	6.60	6.50	6.30	670	-	630	2,350	1,360
Apr-99	-	-	6.64	6.52	6.38	-	-	143	663	340
Sep-99	-	-	6.81	6.69	6.43	-	-	615	1,078	978
Apr-00	7.01	7.08	6.83	6.93	6.49	940	4,120	910	4,420	1,680
Sep-00	-	-	7.46	6.80	6.58	-	-	458	3,540	1,450
May-01	-	-	7.83	6.66	6.63	-	-	345	4,018	1,630
Nov-01	-	-	7.50	6.78	6.56	-	-	510	4,000	1,570
May-02	6.97	7.12	6.99	6.70	6.48	1,065	4,526	652	3,934	1,337
Oct-02	-	-	7.51	6.75	6.51	-	-	441	2,886	1,085
Apr-03	-	-	7.15	6.56	6.52	-	-	669	3,287	1,226
Sep-03	-	-	-	-	-	-	-	-	-	-
Jul-04	6.95	6.96	7.56	6.70	6.50	1,070	2,430	509	3,940	1,610
Oct-04	-	-	-	-	-	-	-	-	-	-
Jun-05	-	-	7.15	6.70	6.45	-	-	665	3,200	1,675
Oct-05	6.91	6.63	7.69	6.69	6.65	1,484	2,665	1,036	2,478	1,268
Apr-06	6.77	7.05	7.21	6.88	6.67	3,580	3,440	2,670	2,600	1,410
Dec-06	-	-	7.40	6.69	6.33	-	-	1,106	2,626	1,432
Mar-07	-	-	7.47	7.06	6.52	-	-	5,312	2,785	1,550
Oct-07	-	-	7.49	6.69	6.36	-	-	2,730	2,694	1,630
Apr-08	-	-	-	-	-	-	-	-	-	-
Oct-08	6.57	6.5	7.12	6.37	5.99	3,146	3,587	2,365	2,759	1,949
May-09	-	-	7.67	6.67	6.61	-	-	322	3,083	2,060
Oct-09	-	-	7.11	6.41	6.17	-	-	1,243	3,340	2,430
Apr-10	6.78	6.69	7.20	6.59	6.50	2,557	4,191	1,035	3,510	2,030
Oct-10	-	-	7.34	6.55	6.36	-	-	880	2,781	1,930

Notes:
(1) "-" Measurements not recorded.

TABLE 3

SPECIAL METALS CORPORATION
FORMER SURFACE IMPOUNDMENT AREA

SITE GROUNDWATER QUALITY DATA

	NICKEL (1)									
Date	**86-1**	**86-2**	**86-3**	**86-4**	**86-5**	**86-6**	**83-4**	**81-2**	**81-3**	**94-1**
Jun-91	52.000	3.100	2.800	70.000	3.900	3.300	1.300	--	--	--
Dec-91	16.000	3.200	4.300	25.000	12.000	2.800	2.500	--	--	--
Mar-92	--	1.500	3.300	26.000	4.400	2.200	2.100	--	--	--
Aug-92	21.000	5.500	7.700	30.000	3.300	11.000	4.000	--	--	--
Apr-93	13.000	3.300	4.300	21.000	4.700	1.100	0.750	0.420	--	--
Sep-93	66.000	2.800	2.200	19.000	1.700	0.980	0.070	<0.03	--	--
Mar-94	23.700	0.030	5.400	18.400	6.570	1.400	2.660	0.050	0.720	0.410
Sep-94	15.500	6.090	0.610	14.400	3.860	1.360	0.080	0.040	--	0.030
Mar-95	35.600	4.180	0.250	10.500	1.440	0.920	0.030	0.020	--	0.020
Sep-95	28.300	4.220	0.510	10.700	1.620	1.270	0.040	<0.03	--	0.140
Mar-96	25.900	1.480	0.290	11.000	1.870	1.080	0.050	0.080	--	0.030
Sep-96	17.100	1.290	0.170	7.850	0.930	0.840	0.040	<0.02	--	<0.02
Mar-97	30.400	1.530	0.270	9.640	1.480	0.360	0.060	<0.02	--	0.050
Sep-97	24.200	0.920	0.140	8.570	1.480	1.440	0.040	<0.03	--	0.190
Feb-98	19.600	1.600	0.320	9.430	1.490	0.350	0.080	0.040	--	<0.03
Aug-98	--	--	0.260	10.300	0.590	--	0.050	<0.01	--	--
Sep-98	--	--	0.670	9.950	0.670	--	0.060	<0.01	--	--
Apr-99 (2)	--	--	0.640	11.900	0.750	--	--	--	--	--
Sep-99	--	--	0.680	8.720	0.970	--	--	--	--	--
Apr-00	9.930	--	0.630	10.800	1.070	--	0.050	--	--	--
Sep-00	--	--	0.030	9.580	0.640	--	--	--	--	--
May-01	--	--	0.015	10.400	0.420	--	--	--	--	--
Nov-01	--	--	0.045	9.480	0.612	--	--	--	--	--
May-02	9.300	--	0.317	11.100	0.662	--	0.055	--	--	--
Oct-02	--	--	0.258	8.530	0.689	--	--	--	--	--
Apr-03	--	--	0.022	9.440	0.686	--	--	--	--	--
Sep-03	--	--	--	--	--	--	--	--	--	--
Jul-04	4.560	--	0.249	6.640	0.649	--	0.557	--	--	--
Oct-04	--	--	--	--	--	--	--	--	--	--
Jun-05	--	--	0.158	5.960	0.755	--	--	--	--	--
Oct-05	5.290	--	0.042	5.970	0.757	--	0.0704	--	--	--
Apr-06	4.960	--	0.0366	5.250	0.727	--	0.110	--	--	--
Dec-06	--	--	0.0045	5.180	0.868	--	--	--	--	--
Mar-07	--	--	0.0079	5.180	1.190	--	--	--	--	--
Oct-07	--	--	0.0052	5.860	0.589	--	--	--	--	--
Apr-08	--	--	--	--	--	--	--	--	--	--
Oct-08	3.790	--	0.0061	5.980	0.079	--	0.0559	--	--	--
May-09	--	--	0.00091	6.860	1.020	--	--	--	--	--
Oct-09	--	--	0.00091	6.120	0.985	--	--	--	--	--
Apr-10	3.980	--	0.0046	7.090	0.771	--	0.0504	--	--	--
Oct-10	--	--	0.0045	6.400	0.738	--	--	--	--	--

Notes:

(1) NYSDEC groundwater quality standard for nickel is 0.10 mg/l.
(2) Low-flow sampling began in April 1999 samplling event.
(3) "--" denotes no sample obtained.
(4) All results in mg/L.

TABLE 4

SPECIAL METALS CORPORATION
FORMER SURFACE IMPOUNDMENT AREA

COMPLIANCE WELL NICKEL CONCENTRATIONS
TWO - YEAR MOVING AVERAGES

DATE	WELL 86-3		WELL 86-4		WELL 86-5	
	GROUNDWATER CONCENTRATION	TWO-YEAR MOVING AVERAGE(6)	GROUNDWATER CONCENTRATION	TWO-YEAR MOVING AVERAGE(6)	GROUNDWATER CONCENTRATION	TWO-YEAR MOVING AVERAGE(6)
Jun-91	2.800		70.000		3.900	
Dec-91	4.300		25.000		12.000	
Mar-92	3.300		26.000		4.400	
Aug-92	7.700	4.560	30.000	37.750	3.300	5.900
Apr-93	4.300	4.900	21.000	25.500	4.700	6.100
Sep-93	2.200	4.375	19.000	24.000	1.700	3.530
Mar-94	5.440	4.910	18.400	22.100	6.570	4.070
Sep-94	0.610	3.138	14.400	18.200	3.860	4.210
Mar-95	0.250	2.125	10.500	15.575	1.440	3.393
Sep-95	0.510	1.703	10.700	13.500	1.620	3.370
Mar-96	0.290	0.415	11.000	11.650	1.870	2.200
Sep-96	0.170	0.305	7.850	10.013	0.930	1.470
Mar-97	0.270	0.310	9.640	9.798	1.480	1.480
Sep-97	0.140	0.218	8.570	9.265	1.480	1.440
Feb-98	0.320	0.225	9.430	8.873	1.490	1.345
Sep-98	0.670	0.350	9.950	9.398	0.670	1.280
Apr-99	0.640	0.443	11.900	9.963	0.750	1.098
Sep-99	0.683	0.578	8.720	10.000	0.968	0.970
Apr-00	0.630	0.656	10.800	10.343	1.070	0.865
Sep-00	0.030	0.496	9.580	10.250	0.640	0.857
May-01	0.015	0.340	10.400	9.875	0.421	0.775
Nov-01	0.045	0.180	9.480	10.065	0.612	0.686
May-02	0.317	0.102	11.100	10.140	0.662	0.584
Oct-02	0.258	0.159	8.530	9.878	0.689	0.596
Apr-03	0.022	0.161	9.440	9.638	0.686	0.662
Sep-03	NS	0.199	NS	9.690	NS	0.679
Jul-04	0.249	0.176	6.640	8.203	0.649	0.675
Oct-04	NS	0.136	NS	8.040	NS	0.668
Jun-05	0.158	0.204	5.960	6.300	0.755	0.702
Oct-05	0.042	0.150	5.970	6.190	0.757	0.720
Apr-06	0.0366	0.079	5.250	5.727	0.727	0.746
Dec-06	0.0045	0.060	5.180	5.590	0.868	0.777
Mar-07	0.0079	0.023	5.180	5.395	1.190	0.886
Oct-07	0.0052	0.014	5.860	5.368	0.589	0.844
Apr-08	NS	0.006	NS	5.407	NS	0.882
Oct-08	0.0061	0.006	5.980	5.673	0.079	0.619
May-09	0.00091	0.004	6.860	6.233	1.020	0.563
Oct-09	0.00091	0.003	6.120	6.320	0.985	0.695
Apr-10	0.00460	0.003	7.090	6.513	0.771	0.714
Oct-10	0.00450	0.003	6.400	6.618	0.738	0.879

NOTES:
(1) Statistical evaluation began in June 1991, when consistent sampling regime for nickel established.
(2) Low-flow sampling began with April 1999 sampling event.
(3) NYSDEC Groundwater Quality Standard = 0.10 mg/L.
(4) Results reported in mg/L.
(5) NS- Not Sampled
(6) Two-year moving average calculated using actual number of data points (4, 3, or 2) within the specific two-year period.
U - Not Detected

PATH: T:\2290_SMC\SurfaceImpoundment_Wells.mxd

FIGURE 1

This document was developed in color. Reproduction in B/W may not represent the data as intended.

Legend

⊕	SAND & GRAVEL MONITORING WELL
⊕	TILL MONITORING WELL

SPECIAL METALS CORP.
4317 MIDDLE SETTLEMENT RD.
NEW HARTFORD, NEW YORK

FORMER SURFACE IMPOUNDMENT SITE PLAN

0 50 100 200
Feet

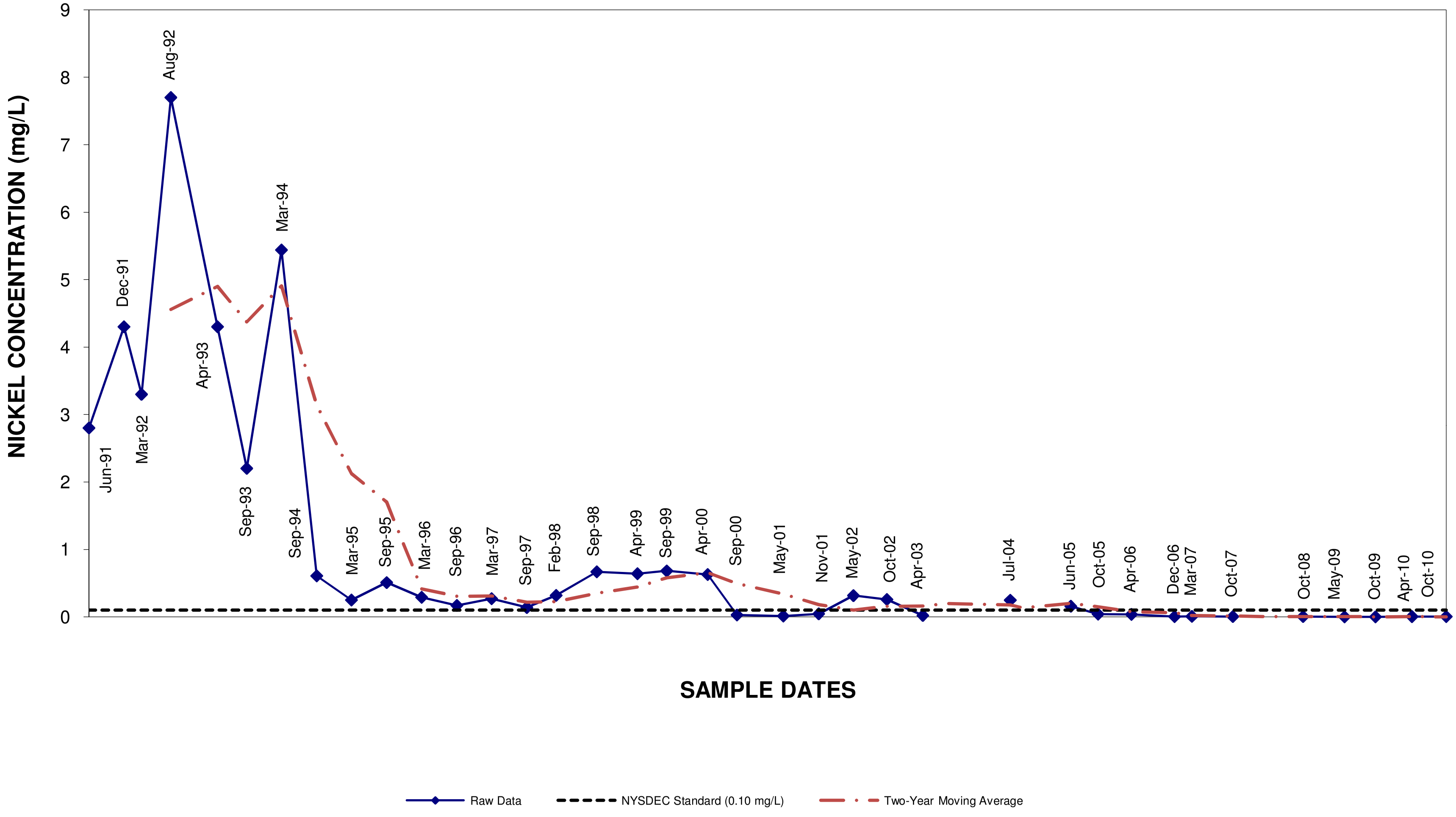
MAY 2010
2290/44544

O'BRIEN & GERE

DATE: 5/18/2010 1:24:12 PM

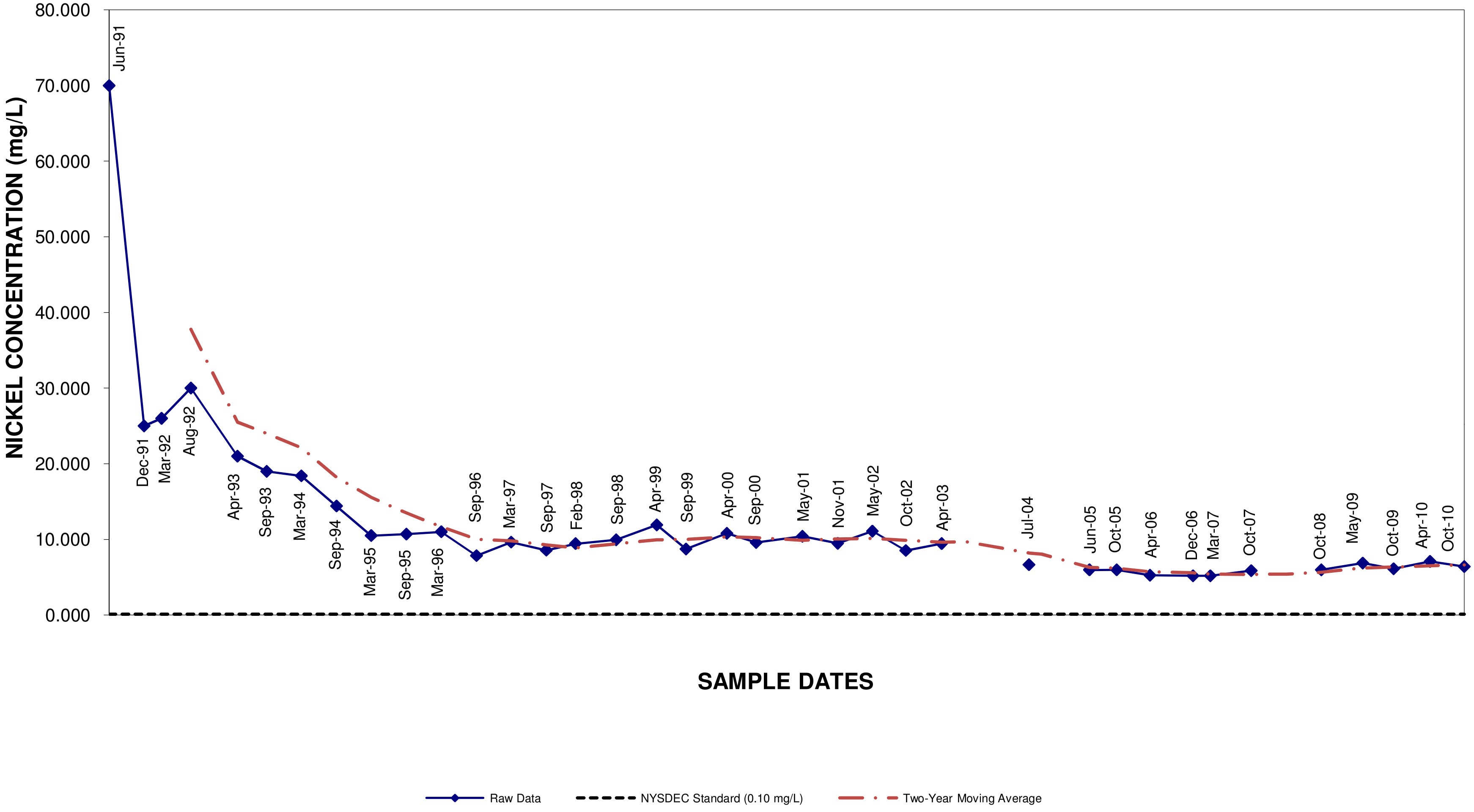
O'BRIEN & GERE

FIGURE 2
SPECIAL METALS CORPORATION
FORMER SURFACE IMPOUNDMENT AREA
GROUNDWATER QUALITY DATA (WELL 86-3)



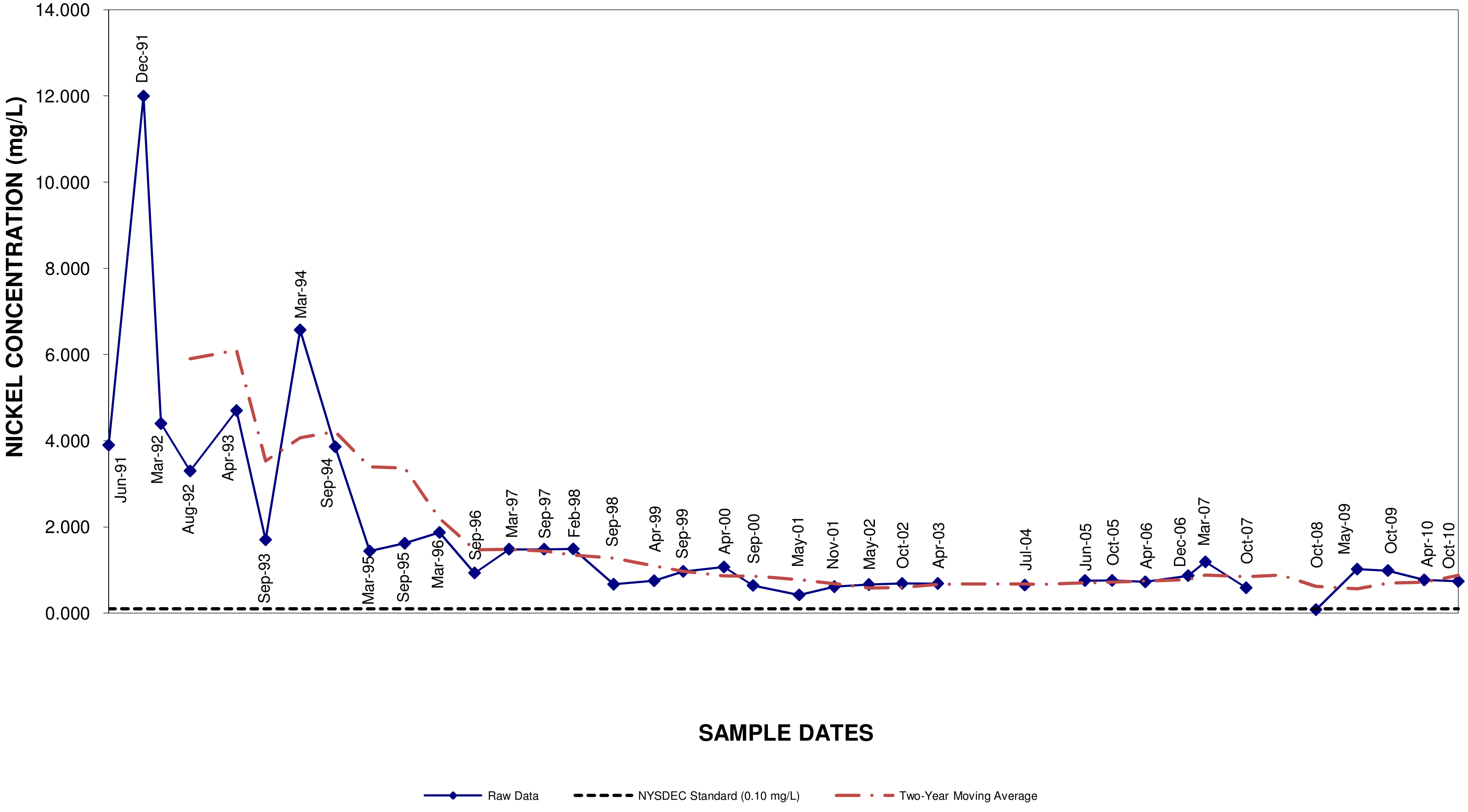
O'BRIEN & GERE

FIGURE 3
SPECIAL METALS CORPORATION
FORMER SURFACE IMPOUNDMENT AREA
GROUNDWATER QUALITY DATA (WELL 86-4)



O'BRIEN & GERE

FIGURE 4
SPECIAL METALS CORPORATION
FORMER SURFACE IMPOUNDMENT AREA
GROUNDWATER QUALITY DATA (WELL 86-5)



Attachment 1

Groundwater Monitoring Program Schedule

ATTACHMENT 1

SPECIAL METALS CORPORATION
GROUNDWATER MONITORING PROGRAM SCHEDULE
YEARS 2009 THROUGH 2012

		Sample MW's					Water Levels									
		86-1	86-3	86-4	86-5	83-4	86-1	86-2	86-3	86-4	86-5	86-6	83-4	81-2	94-1	Mud Creek
2009	Spring		X	X	X											
	Fall		X	X	X		X	X	X	X	X	X	X	X	X	X
2010	Spring	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Fall		X	X	X											
2011	Spring		X	X	X											
	Fall		X	X	X		X	X	X	X	X	X	X	X	X	X
2012	Spring	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Fall		X	X	X											

Attachment 2

Low Flow Groundwater Sampling Logs – October 2010

O'Brien & Gere Engineers, Inc. **Low Flow Ground Water Sampling Log**

Date	10-18-10	Personnel	CYV	Weather	overcast
Site Name	Special Metals	Evacuation Method	Peristaltic pump	Well #	MW-86.3
Site Location	New Hartford, NY	Sampling Method	Peristaltic pump	Project #	

Well information:

Depth of Well * 34.27 ft.

Depth to Water * 8.04 ft.

Length of Water Column ______ ft.

* Measurements taken from

☐ Top of Well Casing

☐ Top of Protective Casing

☐ (Other, Specify)

Start Purge Time: 1130

Elapsed Time (min.)	(0.3-ft) Depth To Water (ft)	(3%) Temperature (celsius)	(0.1) pH	(3%) Conductivity (ms/cm)	(10 mV) Oxidation Reduction Potential	(10%) Dissolved Oxygen (mg/l)	(10%) Turbidity (NTU)	(100-500 ml/min) Flow Rate (ml/min).
0	8.80	13.90	7.22	0.876	-30.9	4.99	24	250
5	9.10	14.11	7.33	0.886	10.3	4.38	11	200
10	9.03	14.15	7.35	0.883	34.5	4.25	8	200
15	9.00	14.23	7.34	0.876	49.3	3.98	2.6	200
20	9.00	13.92	7.34	0.877	59.2	3.78	2.4	200
25	9.00	13.66	7.34	0.873	63.2	3.65	1.9	200
30	9.00	13.90	7.33	0.875	66.0	3.62	1.7	200
35	9.00	13.90	7.34	0.880	68.2	3.64	1.7	200

End Purge Time: 1205

Water sample:

Time collected: 1210

Total volume of purged water removed: ~2.0 gall

Physical appearance at start

Color Clear

Odor NO

Sheen/Free Product NO

Physical appearance at sampling

Color Clear

Odor NO

Sheen/Free Product NO

Field Test Results:

Dissolved ferrous iron:

Dissolved total iron:

Dissolved total manganese:

Dissolved Oxygen:

Analytical Parameters: MS/MSD collected

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH

O'Brien & Gere Engineers, Inc. **Low Flow Ground Water Sampling Log**

Date 10-18-10
Personnel CYV
Weather
Site Name Special Metals
Evacuation Method Peristaltic pump
Well # MW-86-4
Site Location New Hartford, NY
Sampling Method Peristaltic pump
Project #

Well information:

Depth of Well * 29.57 ft.
Depth to Water * 10.00 ft.
Length of Water Column ft.

* Measurements taken from
☐ Top of Well Casing
☐ Top of Protective Casing
☐ (Other, Specify)

Start Purge Time: 1220

Elapsed Time (min.)	(0.3-ft) Depth To Water (ft)	(3%) Temperature (celsius)	(0.1) pH	(3%) Conductivity (ms/cm)	(10 mV) Oxidation Reduction Potential	(10%) Dissolved Oxygen (mg/l)	(10%) Turbidity (NTU)	(100-500 ml/min) Flow Rate (ml/min).
0	10.00	14.43	6.76	2.599	-23.2	0.86	25	200
5	10.20	14.00	6.64	2.672	-27.5	0.51	14	200
10	10.20	14.16	6.59	2.739	-29.4	0.41	14	250
15	10.20	14.03	6.57	2.772	-32.1	0.36	9.0	250
20	10.20	13.98	6.56	2.780	-33.4	0.39	7.6	250
25	10.20	13.95	6.55	2.801	-35.4	0.46	4.8	250
30	10.20	13.98	6.55	2.796	-36.0	0.39	4.6	250
35	10.20	14.00	6.55	CW ~~2.781~~ 2.781	-35.7	0.39	3.4	250

End Purge Time: 1255

Water sample:

Time collected: 1300

Total volume of purged water removed: ~2.0 gall

Physical appearance at start
Color clear
Odor NO
Sheen/Free Product NO

Physical appearance at sampling
Color clear
Odor NO
Sheen/Free Product NO

Field Test Results:
Dissolved ferrous iron:
Dissolved total iron:
Dissolved total manganese:
Dissolved Oxygen:

Analytical Parameters:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH

O'Brien & Gere Engineers, Inc. — Low Flow Ground Water Sampling Log

Date	10-18-10	Personnel	CYV	Weather	overcast
Site Name	Special Metals	Evacuation Method	Peristaltic pump	Well #	MW-86-S
Site Location	New Hartford, NY	Sampling Method	Peristaltic pump	Project #	

Well information:

Depth of Well * 19.55 ft.
Depth to Water * 8.13 ft.
Length of Water Column ______ ft.

* Measurements taken from
☐ Top of Well Casing
☐ Top of Protective Casing
☐ (Other, Specify)

Start Purge Time: 1050

Elapsed Time (min.)	(0.3-ft) Depth To Water (ft)	(3%) Temperature (celsius)	(0.1) pH	(3%) Conductivity (ms/cm)	(10 mV) Oxidation Reduction Potential	(10%) Dissolved Oxygen (mg/l)	(10%) Turbidity (NTU)	(100-500 ml/min) Flow Rate (ml/min).
0	8.13	14.69	6.54	1.894	-49.5	1.64	10	250
5	8.45	14.69	6.45	1.907	-46.6	0.89	8	200
10	8.48	14.62	6.41	1.918	-47.5	0.82	6.3	200
15	8.48	14.60	6.40	1.921	-55.5	0.70	5.0	200
20	8.48	14.58	6.37	1.930	-72.5	0.52	3.8	200
25	8.48	14.54	6.36	1.930	-82.0	0.54	1.9	200
30	8.48	14.50	6.36	1.930	-86.9	0.51	1.0	200

End Purge Time: 1120

Water sample:

Time collected: 1125

Total volume of purged water removed: ~ 2.0 gall

Physical appearance at start
Color clear
Odor no
Sheen/Free Product no

Physical appearance at sampling
Color clear
Odor no
Sheen/Free Product no

Field Test Results:
Dissolved ferrous iron: ______
Dissolved total iron: ______
Dissolved total manganese: ______
Dissolved Oxygen: ______

Analytical Parameters: BD collected

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH

Cad-903ai

Attachment 3

Laboratory Analytical Data Summary – October 2010

Analytical Results

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: Life Science Laboratories, Inc   Contract:

Lab Code: LSLB   Case No.   SAS No.:   SDG No.: K101018

SOW No.: ILM04.1

EPA Sample No.	Lab Sample ID.
MW-86-3-101810	K1010189-002
MW-86-3-101810D	K1010189-002
MW-86-3-101810S	K1010189-002
MW-86-4-101810	K1010189-003
MW-86-5-101810	K1010189-001
X-1	K1010189-004

Were ICP interelement corrections applied? [✓ Yes]/No ____

Were ICP background corrections applied? [✓ Yes]/No ____

If yes-were raw data generated before application of background corrections? Yes/[✓ No] ____

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature

Signature: ____________   Name: ____________

Date: ____________   Title: ____________

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO
MW-86-5-101810

Lab Name: Life Science Laboratories, Inc   Contract:

Lab Code: LSLB   Case No.   SAS No.:   SDG No.: K1010189

Matrix (soil/water): WATER   Lab Sample ID: K1010189-001

Level (low/med): LOW   Date Received: 10/18/2010

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-02-0	Nickel	738			P

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

MW-86-3-101810

Lab Name: Life Science Laboratories, Inc Contract:

Lab Code: LSLB Case No. SAS No.: SDG No.: K1010189

Matrix (soil/water): WATER Lab Sample ID: K1010189-002

Level (low/med): LOW Date Received: 10/18/2010

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-02-0	Nickel	4.5	B		P

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

MW-86-4-101810

Lab Name: Life Science Laboratories, Inc Contract:

Lab Code: LSLB Case No. SAS No.: SDG No.: K1010189

Matrix (soil/water): WATER Lab Sample ID: K1010189-003

Level (low/med): LOW Date Received: 10/18/2010

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-02-0	Nickel	6400			P

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

X-1

Lab Name: Life Science Laboratories, Inc Contract:

Lab Code: LSLB Case No. SAS No.: SDG No.: K1010189

Matrix (soil/water): WATER Lab Sample ID: K1010189-004

Level (low/med): LOW Date Received: 10/18/2010

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-02-0	Nickel	749			P

Comments:

Life Science Laboratories, Inc.
Brittonfield Lab

5854 Butternut Drive
East Syracuse, New York 13057
(315) 445-1105

Chain of Custody

Client: O'BRIEN & GERE
Project: Sp. Metals Co.
Sampled by: CYV
Client Contact: Dave Carnevale Phone #

Sample Description

Sample Location	Date Collected	Time Collected	Sample Matrix	Comp. or Grab	No. of Containers	Nickel							Comments
MW-86-5-101810	10-18-10	1125	GW	G	1	X							
MW-86-3-101810	↓	1210	↓	↓	1	↓							
MW-86-3-101810 (MS)	↓	1210	↓	↓	1	↓							
MW-86-3-101810 (MSD)	↓	1210	↓	↓	1	↓							
MW-86-4-101810	↓	1300	↓	↓	1	↓							
X-1		-			1	↓							

Relinquished by: C. Yuri Veliz	Date: 10/18/10	Time: 1428	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by Lab:	Date: 10-18-10 14:28 RCVD	Time:
Shipment Method:			Airbill Number:	10-18-10 14:28 RCVD	

Turnaround Time Required:
Routine__________
Rush (Specify)__________
Cooler Temperature: 5.8°C on ICE

Comments:

Original - Laboratory
Copy - Client